Affordable Housing Policy for Urban Areas.

State interventions and specific actions points under Draft Model State Affordable Housing Policy for Urban Areas:

Since the Constitution of India envisages provision of Housing as the primary responsibility of the State Government, major initiatives are proposed to be taken by the State as part of the vision of the Government to provide affordable housing for all residents. Few interventions are listed below:

- At least 15% of the total project Floor Area Ratio (FAR)/Floor Space Index (FSI) or 35% of the total number of dwelling units, whichever is higher, will be reserved for EWS category.

- The State Government including that of its agencies such as the Urban Development Authorities, Housing Boards, other parastatal agencies and Urban Local Bodies (ULBs) will, as far as possible, provide land for affordable housing projects.

- Subject to any Central Law, a people friendly land acquisition policy for the State will be created for undertaking affordable housing projects.

- Various models for assembling land will be encouraged in both Government and Private sectors by offering trunk infrastructure facilities and transportation linkages to such site.

- The policy aims to create an inventory of land holdings in cities to constitute a land bank and prepare an asset management plan for better management of the available land and targeting its supply to create affordable housing dwelling units. The State shall compile and maintain the inventory.

- The State will also develop innovative ways for capturing the value of land by way of developing infrastructure and regional connectivity.

- The State shall notify a policy on property rights to slum dwellers to provide title to the land and a non-eviction policy for residents of slums with over 5 years of documented stay in a particular location.

- Mortgageable leasehold property rights and land titles for the EWS and LIG categories shall be facilitated by the Revenue Department and the ULBs.

- Infrastructure services including water supply, sanitation, health, education facilities to existing housing colonies where there is absence of such facilities will be ensured.

- Special dispensation to the socially vulnerable sections like senior citizens, women, students, physically challenged, SC/ST/OBC and Minorities, etc. of the State shall be made.

- In situ Slum upgradation of slums and allied infrastructure will be taken up by tying up various schemes of Central and State Government.

The agencies responsible for various works to be implemented in Assam under majority of the central government's initiative are Town and Country Planning Department, Housing Board or Slum Board etc..

In Silchar region, due to pressure in the urban areas, rampant development has taken place. Therefore, in order to have a streamlined growth in the coming future, Silchar will require a Housing policy for the SMPA. Various Indian states like Madhya Pradesh, Chhattisgarh, Maharashtra, Karnataka etc. have introduced housing policy in order to have ordered development in the state. Thus, Assam Government shall also come up with a detailed Housing Policy. This policy should focus on various issues being faced by regions in terms of Housing.

It is noticed that a large number of unapproved layouts and sub-divisions have been developed in the Silchar regions without adequate infrastructure and public civic amenities and most of the plots in such layouts and sub-divisions have been purchased by ignorant people and there is no way to convert these layouts and sub-divisions or plots back to their original land use;

It is expedient to regularise the plots in such unapproved layouts or sub-divisions, so as to protect the interests of ignorant purchasers and to mobilise financial resources in order to provide basic infrastructure facilities in areas where such unapproved layouts have come up.

Regularization of unapproved layouts will enable the purchasers to avail institutional finances to build houses at affordable interest rates and to improve their security of tenure and thereby their quality of life. It is also observed that regularisation of sold out plots alone without considering the layout or subdivision as a whole will result in discontinuous pockets of development, causing enormous difficulties to the Local Bodies to provide services to the regularised plots in isolation and therefore, it is considered necessary to regularise these unapproved layouts and sub-divisions in their entirety by insisting to widen the roads, improve circulation, reserve areas for open space and public purpose to the extent feasible in each layout.

Effect of regularization – Plots regularised under this scheme shall be deemed to be regularised for residential use.

Some imperative objectives of the Housing Policy to be formulated is described as under:

- To facilitate affordable housing in urban and rural areas, create adequate housing stock for Lower Income Group (LIG), Economically Weaker Section (EWS) and shelters for the poorest of the poor on ownership or rental basis.

- To pursue the target of cities without slums through equitable slum redevelopment and rehabilitation strategy and shelters for the poor.

- To deregulate housing sector and encourage competition and public private partnerships in financing, construction and maintenance of houses for Lower Income Groups (LIG) and Weaker Sections of the society.

- To rationalize development control regulations and streamline approval procedures.

- To promote rental housing and incentives to different options of rental housing for weaker sections.

- To facilitate the redevelopment and renewal of inner city areas and dilapidated buildings through options of land assembly; conserving heritage structures and places of archeological importance.

- Encourage technology innovation, training and capacity building of the construction workers to enhance their productivity and improve quality of housing stock.

- To promote larger flow of funds for investment in housing and infrastructure using innovative products and appropriate institutional mechanism.

- To encourage progressive shift from target orientation to a demand driven approach as also from a subsidy-based housing scheme to cost sharing or cost recovery-cum-subsidy schemes.

- To provide for mandatory construction of EWS/LIG housing by the private sector in the government-provided land, government facilitated site or their own projects.

- The policy will orient towards setting up of a land bank to ensure smooth supply of land for projects specifically meant for construction of houses to low-income segment households

- To create skilled manpower for building construction industry and create employment opportunity for low-income group.

- To conserve ecologically sensitive areas and promote environmentally sustainable cities and townships.

- To establish Management Information System to strengthen monitoring of building activity in the Union Territory.

5.4.4 AFFORDABLE HOUSING POLICY

A policy document is a set of guidelines to direct the actions of all persons/ institutions involved or connected regarding any area of activity. Preparation of a housing policy is the need of the hour with respect to growing requirement of shelter and related infrastructure. As discussed in the previous section requirement for shelter is growing in context of rapid urbanization, migration to cities, mismatch between demand and supply of housing (especially affordable housing for EWS/ LIG), and inability of the urban poor to access the formal housing market to fulfil its housing need.

5.5 HOUSING STOCK AND SHORTAGE

Housing shortage is defined as the set of populations who does not hold any house. There may be a growing concern for homeless across big cities during winters, but progress in construction of night shelters has been very slow across most of the states despite the centre providing 75% of funds required for building and refurbishing shelters for the urban homeless. In absence of city level data on the houseless population and pavement dwellers, the houseless population is derived from the data published as part of Census of India, 2011. Details of housing stock, Municipal Board and urban centre wise, in SMPA were computed based on the Census of India, 2011 and are presented in the table 80.

Table 80 Housing Stock in SMPA 2011

Sr. No.	Silchar Planning Area	No. Of Household 2011	Total no. of Housing Stock 2011	Housing Shortage
1	Silchar MB (28 wards) +OG	39890	36465	3425
2	10 (CT) Census Towns	16327	15017	1310
3	Rural (85 Villages)	46,593	33333	13260
	Total for SMPA	**102810**	**84815**	**17995**

*(Source: Compiled based on Census 2011)*
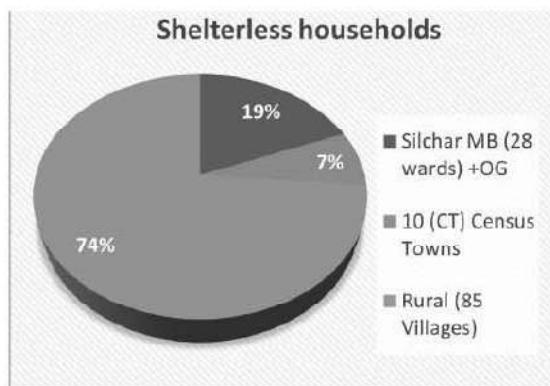
Figure 83 Total household region wise
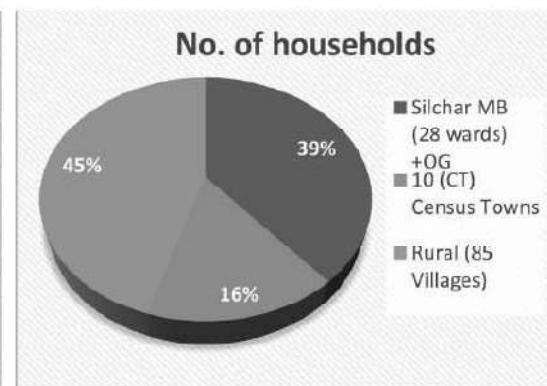
Figure 84 Shelterless household in SMPA

5.6 SLUMS

A Slum, for the purpose of Census, has been defined as residential areas where dwellings are unfit for human habitation by reasons of dilapidation, overcrowding, faulty arrangements and design of such buildings, narrowness or faulty arrangement of street, lack of ventilation, light, or sanitation facilities or any combination of these factors which are detrimental to the safety and health.

According to Census, slums are categorized into notified and identified slums. The high rate of growth of urban population and its accumulative nature with a population has led to increasing problem of housing, reducing privacy and overcrowding in small house, steady growth of slums and unplanned settlements and severe effect on civic services in urban areas in the system.

Slums can be commonly seen in urban areas which are occupied by urban poor or economically weaker sections of the society or the migrants from nearby villages or other states that come to the urban areas in search of employment in order to earn their livelihood. Slums are an indispensable part of our cities because as the cities grow, due to economic and physical growth of the urban area, people migrate from different areas in search of employment. So, to provide basic amenities to the urban poor and slum dwelling people this aspect needs to be incorporated while doing urban study to have an overall development of the city. Planning is for the people and in a way, slums are an indispensable part of the society. To make the city livable for all and to improve the condition of slums, this comprehensive study regarding slums plays a vital role in planning.

5.6.1 REASON FOR SLUM

The Silchar region presents a wide range of activities in various institutional, Commercial and tourism sectors. Growth in such activities, possibilities of absorption in various service sectors, scope of employment in trade and business activities, hawking, retailing, carting etc., could have attracted more rural poor to the urban. Due to their economic status, these urban poor are unable to get a house within their limited income and hence occupy vacant spaces wherever available and lead a marginal level of living. These habitations in due course develop into slums proliferate exponentially further due to rapid urbanization and natural growth of population. In this scenario, the role of Government in tackling the slum becomes more pertinent.

5.6.2 IMPACT OF SLUM

The development of slums leads to Poor environmental conditions in such areas which lead to poor health, which aggravates poverty and often results in lower educational levels, as well as loss of income owing to sickness, disease, and increased spending on health care, which may deplete household savings. On the other hand, environmental problems exacerbate urban poverty and poor neighbourhoods suffer disproportionately from inadequate water and sanitation facilities and indoor air pollution. Poor people living in slum are often forced to live in environmental unsafe areas, steep hillsides and flood plains or polluted sites near solid waste dumps, open drains and sewers, and polluting industries. Conflicts like quarrel, clash and fight in the squatters of this area is a regular phenomenon. This creates noise and violence which leads to lack of security in the area and disturbs the city dwellers, particularly the nearby residents, office workers, and school children. Besides, many of the residents are involved in prostitution, drug trafficking, hijacking, smuggling etc. These activities threaten the social and cultural environment of the city.

5.6.3 SLUMS IN SMPA

As per Census 2011, there are 22749 persons living in slums within Silchar MB and OG area which is approximately 12.71% of town population.

Table 81 Percentage of slum population from total population

Town Name	Total Population of Town	Slum Population	Percentage share from total population (%)
Silchar (MB + OG)	178865	22749	12.71%

(Source: Census 2011, Compiled by Consultant)

5.6.4 SLUMS BY WARDS

Areas notified as slums by the respective municipalities, corporations, local bodies or development authorities are treated as "notified slums". In any city, it is generally observed that the slum is developed mostly near their working places. Slum dwellers first prefer the location of land which is nearer to the workplace and then they prefer the location where basic amenities such as water, proximity to public transport etc. is available. That is why slums generally develop near the industries, wholesale-markets, godowns, railway stations and even in residential areas. They generally use public-transport or slow-moving vehicles such as cycle, rickshaws etc. as it is economical.

The **figure 85** shows the location of notified slums across the Planning area.
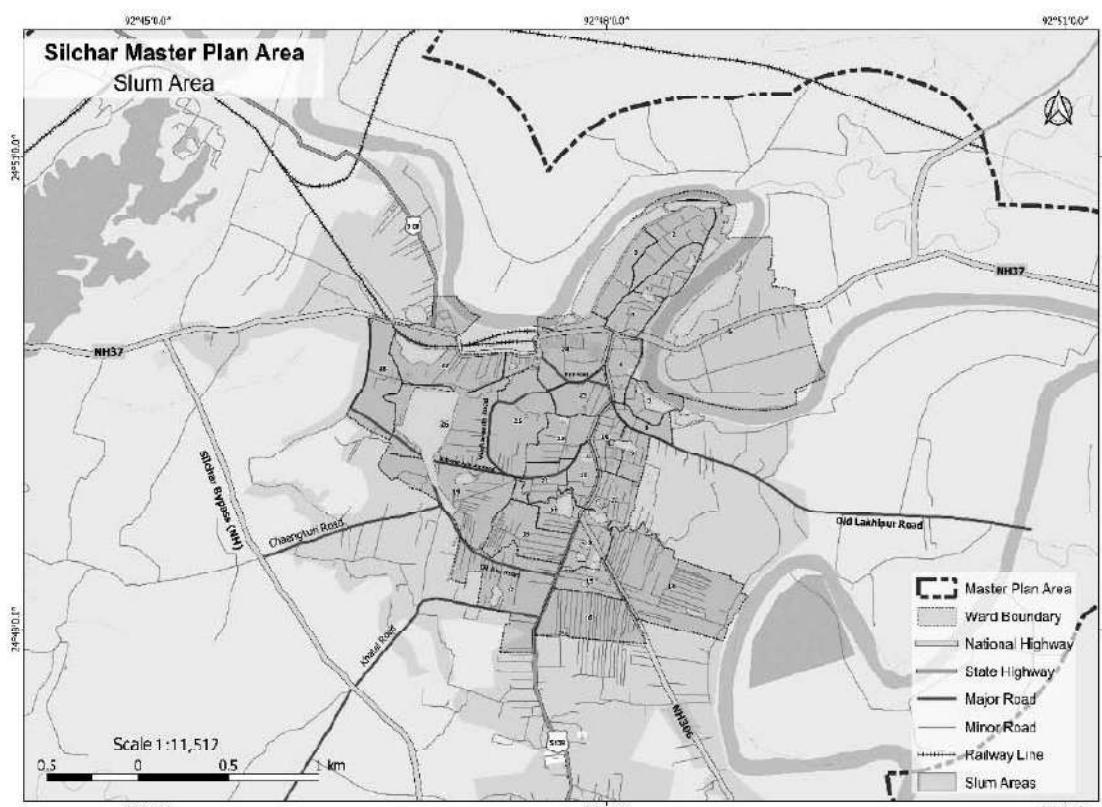

Figure 85 Notified and Non-notified slums area

Few slums are already situated within city area which are marked here in light sky blue colour polygon. The hygiene condition within slum area is degraded and major area is found with litters and thrown garbage. Open channel sewerage is a part of slum which also spills over with garbage at some places. Some patch of slum area along riverbank is non notified as they are accompanied by legal properties. Owing to slum area the premises is lacking in fundamental amenities of sanitation and hygiene. The area is on the rudimentary level of development. Slum area develops unhygienic conditions for the local areas as well. Below mentioned are the slums located within municipal area with number of households.

Table 82 Slum population and housing details

Sr. No.	Wards No.	Name of Slums	No. of Slum Household	Sr. No.	Wards No.	Name of Slums	No. of Slum Household
1	1	Diversion road	70	33	5	ShimulTola	500
2	1	Vibekanada lane	250	34	5	Rajpath road	100
3	1	Radha raman pally	250	35	5	Gangapara	200
4	1	Ghat (Gandhi Ghat)	250	36	5	Durganagr	400
5	2	Manipur basti	400	37	5	Srikrishna Sarani	400
6	2	Ghoniwala END road	80	38	5	Krishna nagar	390
7	2	Shiv Bari END road	150	39	5	Angajur	200
8	2	Radha Govind colony	30	40	7	Kalibari char	3000
9	2	Gopal Nagar	20	41	10	Naga Colony	300
10	2	Chunabatta road	5	42	10	Mahut para	100
11	3	Chunabatta road	12	43	11	Smashan road	80
12	3	Laskaer lane	45	44	12	Adi shicbari road	12
13	3	Munshi safar ali lane	20	45	17	Horizon pally	50
14	3	Ambor Ali lane	15	46	17	Khatal road	20
15	3	Arman ali lane	40	47	19	Giridari lane	20
16	3	Nobab ali lane	35	48	20	A.K azad road	500
17	3	Barbhuiya Lane	40	49	20	Shib colony	20
18	3	Maulana lane	22	50	24	New colony	700
19	3	Saif Uddin lane	70	51	24	Annapurna colony	350
20	3	Jakir Lane	50	52	24	Santi lane	80
21	3	Montaz ali road	17	53	24	Swamiji lane	700
22	3	Sharda pally	28	54	24	Trunkroad	12
23	3	Ramkrishna pally	300	55	26	Radha gobinda lane	80
24	3	Kalibari road	50	56	26	Ambedkar sarani	15
25	3	Itkhola ghat	300	57	26	Gobindapur	22
26	3	Rabindra Nagar	10	58	26	Vibekanada road	20
27	3	Manipur para	225	59	27	Malini bill via girish road	100
28	3	Idgah ghat	30	60	27	T.V center malini	200
29	3	Khudiram sarani	7	61	27	Das para	70
30	3	Radha raman sarani	12	62	27	Goshai para	200
31	4	Durga sanker lane	10	63	27	Goshaipara	150
32	5	Karati gram	500	64	27	New colony	300
						Total	**12634**

(Source. PMAY Survey, Silchar)

5.7 HOUSING DEMAND GAP ANALYSIS

5.7.1 FACTORS CAUSING HOUSING SHORTAGE

There are several factors which would affect the housing shortage. The recent technique in finding the housing shortage is published by Ministry of urban poverty and alleviation. There are 5 major factors which decides the housing shortage in the system. They are -

1. Congestion factors

2. Obsolescence factors

3. Non-Durability

4. Present housing shortage

5. Calculation of housing shortage for 2045 for the projected population

5.7.1.1 Congestion Factor

Congestion factor is the ratio of households that are residing in unacceptable congested conditions, from physical and socio-cultural viewpoints (i.e. married couples sharing the room with other adults etc.,) or the percentage of households in which each married couple does not have separate room to live. The table 83 indicates that the congestion factor for each Municipalities/Commune Panchayats according to the census 2011. It is observed that the planning area shows a uniform congestion factor for all the Municipalities/ communes in Silchar region for the year 2011.

Table 83 Household without exclusive room

Sr. No.	Silchar Planning Area	HH 2011	No exclusive room for marriage couples 2011	Congestion Factor
1	SMB+OG	39890	3052	0.08
2	10 CTs	16327	1143	0.07
3	Rural	46,593	4886	0.10
	Total for SMPA	**1,02,810**	**9081**	**0.09**

(Source: Compiled by Consultant)

5.7.1.2 Obsolescence Factor

Obsolescence factors is all the bad houses, excluding those that are less than 40 years old and all houses ages 80 years or more. Obsolescence are the households living in obsolete buildings (40 to 80 years old in a bad structural condition, and 80 or more years) and excluding temporary houses (to avoid double counting). The table 84 illustrates the Obsolescence Factor for Silchar Planning Area according to Census 2011.

Table 84 Housing shortage due to obsolescence

Sr. No.	Silchar Planning Area	HH 2011	HH above 50+ yrs in SMPA	Obsolescence Factor
1	SMB+OG	39890	1877	0.05
2	10 CTs	16327	653	0.04
3	Rural	46593	2330	0.05
Total for SMPA		102810	4860	0.05

(Source: Compiled by Consultant)

The table reveals that the highest obsolescence factor is observed in SMB+OG and rural area which indicates that the status of housing condition is poor with respect to the overall housing condition of the Silchar Planning Area. It is also observed that the lowest Obsolescence factor is in SMB area which also witnesses

the good quality of socio-economic status in the region mainly due to the urban nature of the area and developments which are in tune with the overall development of the Silchar region.

5.7.1.3 Non-Durability

Non-durability is the no. of temporary houses which are not suitable for living or Non-serviceable units are taken out. Temporary/ kutcha houses are those in which both the walls and roof are made of materials that need to be replaced frequently. As per the census defnition, temporary houses are made with walls and roofs made of temporary material. Walls can be made of grass, thatch, bamboo, plastic, polythene, mud, unburnt bricks or wood. Roofs can be made of grass, thatch, bamboo, wood, mud, plastic or polythene. Hence the non-durability of housing is the difference between the number of housing stock to the number of permanent houses. The table 85 represents the details of permanent, semi-permanent house and temporary house within the SMPA.

Table 85 Housing shortage due to non-durability

Particular		Permanent	Semi-permanent	Temporary	Number of Housing Stock (excluding institutional houses)
Urban	Silchar MB+OG	34,369	12,489	3,425	36465
	Census Towns (CT)	8606	7535	1310	15017
Rural	Rural areas	12221	21111	13260	33333
	Total	55,196	41,135	17,995	84,815

(Source: Compiled by Consultant)

5.7.2 ESTIMATION OF HOUSING SHORTAGE

Acute housing shortage in country specially in urban centres has become a burning problem of the day since house construction activities do not keep pace with the growth of population of urban centres. The number of houses has, therefore, been successively falling short of actual requirement of the urban population.

Based on the Ministry of Housing and Urban Poverty Alleviation, National housing shortage, the final estimation of housing shortage is calculated based on the corresponding factors such as homeless population, Non-durability factor, Congestion factor, Obsolescence. It has been calculated based on the census 2011. For this exercise, the following assumptions were adopted with the reference to the Assam state, District and SMB Housing Profile based on Census 2011 housing data:

- Dilapidated houses accounts for 11% of total housing stock for the project area and 4% for the urban areas.

- Vacant houses accounts for 4% of total housing stock for the project area and 10% for the urban areas.

The details of housing shortage based on census 2011 data are presented in the table

Table 86 Total Housing Shortage in SMPA

Sr. No.	Housing Shortage	No. of Shortage household
1	Shortage due to Homeless Population	17,995
2	Shortage due to Dilapidated Houses	9329
3	Shortage due to Vacant houses	4241
4	Shortage for Slum households	4853
5	Shortage due to congestion in 2011	9081
6	Shortage due to obsolescence in 2011	4860
	Total Housing Shortage (2011)	**50,359**

(Source: Compiled by Consultant)

5.8 HOUSING DEMAND GAP ANALYSIS

The future housing requirement for SMPA has been assessed considering both, the quantitative housing shortage, and the qualitative housing shortage. Below mentioned is the quantitative calculation of future housing requirement for year 2045.

Table 87 Decadal additional housing requirement

Year	Additional Population	HH size	Additional HHs
2021	87879	4.5	19529
2031	98208	4	24552
2041	93538	4	23385
2045	55599	4	13900
Total Additional Housing Requirement till 2045			**81365**

(Source: Compiled by Consultant)

For the 2021 housing projection considered average household size is 4.5; while for 2031,2041 and 2045 projection 4 household size is considered, based on the assumptions of having more numbers of nuclear families in the future than today and constant household formation rate for the entire Planning Area. The projected additional housing requirement considering increase in population by 2045 is 81365.

Table 88 Total Housing Demand by 2045

Sr. No.	Particulars	Numbers
1	Region	SMPA
2	Total Population 2011	471709
3	Total Household	102810
4	No. of Housing Stock 2011	84,815
5	Housing Gap (Factor 1)	17,995
6	No. of Good and Livable Houses	69048
7	No. of Dilapidated houses (Factor 2)	9329
8	Congestion Factor 2011	0.09
9	Shortage Due to Congestion Factor (Factor 3)	9081
10	Obsolescence Factor 2011	0.05
11	Shortage due to Obsolescence Factor (Factor 4)	4860
12	No. of Locked and Vacant houses (Factor 5)	4241
13	No. of Slum houses (Factor 6)	4853
14	Projected Population 2045	806933
15	Projected Increase in Population from 2011 to 2045	335224
16	Housing requirement for increase in Population (Factor 7)	81365
Total Housing Demand – 2045 (Factor 1+2+3+4+5+6+7)		**1,31,724**

(Source: Compiled by Consultant)

5.9 HOUSING PROVISION

The housing provision is met can be accommodate in the proposed Residential, Mixed Use and Conservation zones. Further, the residential and mixed uses zones are divided into different categories; with each has various FSI to offer so the development intensity can be managed. It is proposed to facilitate the provision of a fully serviced dwelling unit for each family and reduce the gap between housing shortage and supply through suitable measures. The planned catering for the additional housing is as mentioned in table 89.

Table 89 Decadal housing provision in SMPA

Year	Additional Population	HH size	Additional HH	Catering for the Shortage	Total Housing Need (decade wise)
2021	87879	4.5	19529	17626(35%)	37155
2031	98208	4	24552	15107(30%)	39659
2041	93538	4	23385	10072(20%)	33457
2045	55599	4	13900	7553(15%)	21453
Total			81365	50,359	131724

(Source: Compiled by Consultant)

For the decade 2021, 35% catering for housing shortage is been considered by taking benefit of the different housing schemes and state-central government fund utilization. Similarly, 30%,20% and 15% catering for year 2031,2041 and 2045, respectively.

5.9.1 HOUSING PROVISION BASED ON INCOME GROUP

Table 90 Housing provision considering Income Group

Year	Total Housing Need (Decadal)	EWS 20%	LIG 30%	MIG 40%	HIG 10%
2021	37155	7431	11147	14862	3716
2031	39659	7932	11898	15864	3966
2041	33457	6691	10037	13383	3346
2045	21453	4291	6436	8581	2145
Total	131724	26345	39517	52690	13172

(Source: Compiled by Consultant)

As per the Ministry of Urban Poverty and Alleviation the population is categorised based on the income level such as Economically Weaker Section (EWS), Low Income Group (LIG), Medium Income Group (MIG) and High-Income Group (HIG). The table 84 indicates that the housing shortage for 2045 is calculated for each classification based on income level. This table helps to earmark the affordable housing in the Silchar Planning Area and would also help to formulate the housing policy.

5.10 HOUSING POLICY

The main objective of the housing policy for Silchar Planning Area is not only to meet the housing demand by horizon 2045 but also to improve the residential conditions at large. In view of this, Master Plan proposes development of residential neighborhoods having adequate facilities within walk able distance. Design considerations require better planning.

Private sector Participation

Privatization must be encouraged by participation of individuals and developers in the house building activities. The local administration could provide land with offsite and on-site physical and social infrastructure and the private entrepreneurs could invest in house building. In principles, housing has four distinct components for its development i.e., Land Assembly, infrastructure provision, building construction and post occupancy management. The above diagram gives an idea how these activities should be distributed amongst the Government, private and cooperatives making the Government a facilitator for housing development.

Role of Government

Government has to play proactive role of promoting the housing industry by regulatory measures and acting as a watch-dog rather than fully involving its organs in the provision of shelter to the town inhabitants. The magnitude of housing shortage is enormous and the State on its own cannot provide the housing stock. Government will limit its role to development of serviced land and subsequently its release to private developers and Cooperative Societies on premium equivalent to the cost of land plus marginal profit with only advisory and regulatory role in the development of housing industry.

Housing of Different Income Categories

The Master Plan recommends identification of priorities in dealing with different segments of the population. Out of the total demand, income category wise demand has been given in fixing the priority in dealing with different segments of the population: H.I.G. and M.I.G. dwelling units shall be provided with only developed land at market price to cross subsidize the housing for E.W.S./L.I.G.

Group Housing Schemes

To meet the housing demand by 2045, based on the need housing colonies or townships can be developed. Economies of scale are favorable to large colonies because of reduced per capita on investment on infrastructure and services development in large colonies. The Master Plan also envisages smart growth of the city to overcome the scarcity of land and regulate sprawl of urban development in rich agricultural hinterland.

Urban Village

The peripheral village settlements, which have been incorporated in the Planning Area of Silchar, are going to be part of its proposed Urban Area Limits during the process of its expansion. The settlements having a completely different life-style for centuries are now getting merged into urban environment and need a sensitive approach in the planning and development process. At present these settlements do not confirm to any urban character and need an 'Action Plan' for extension of water supply, sewerage and drainage facilities and other basic urban amenities and efficient linkages with the main city. The settlements should get the modern services and amenities and should also be catered for their traditional cultural styles.

5.11 SLUM UPGRADATION PROGRAM

The scheme aims at acquiring sites in various parts of urban areas and to construct tenements and provide developed plots under "Sites and Services" concept to the slum dwellers. Improvement works to the existing Slums are being implemented through the Assam State Housing Board. The tenements in storeyed blocks are made available to the slum dwellers on rental basis. Apart from that, upgradation of slum areas by extending basic amenities viz., roads, water supply, sewerage, education, health, electricity, social infrastructure are also undertaken.

5.11.1 RAJIV AWAS YOJNA (RAY)

Rajiv Awas Yojna a path breaking centrally sponsored scheme for the slum dwellers and urban poor envisages a "Slum Free India" through encouraging states to tackle the problem of slums in holistic manner. The main objectives of RAY are -

1. Bringing existing slums within the formal system and enabling them to avail the same level of basic amenities as the rest of the town.

2. Redressing of failures of the formal system that lie behind the creation of slums.

3. Tackling the shortage of urban land and housing that keep shelter out of reach of the urban poor and force them to resort to extra-legal solutions in a bid to retain their sources of livelihood and employment.

5.11.2 PRADHAN MANTRI AWAS YOJANA (PMAY)

The "Pradhan Mantri Awas Yojana (Urban) - Housing for All" was launched by Government of India with an objective of providing houses to every family by the year 2022. The Mission is being implemented during 2015-2022 and provides central assistance to Urban Local Bodies (ULBs) and other implementing agencies through States/UTs. The "Pradhan Mantri Awas Yojana (Urban) - Housing for All" has following four Sub-schemes giving options for beneficiaries, ULBs / Implementing Agencies and the State Governments:

1. In-situ Slum rehabilitation of Slum Dwellers

2. Credit Linked Subsidy Scheme.

3. Affordable housing in partnership with Public & Private sectors.

4. Beneficiary Led Individual House Construction or enhancement.

5.11.2.1 In-situ Slum Rehabilitation of Slum Dwellers (ISSR)

"In-situ" slum rehabilitation using land as a resource with private participation for providing houses to eligible slum dwellers is an important component of the "Pradhan Mantri Awas Yojana (Urban) – Housing for All" mission. This approach aims to leverage the locked potential of land under slums to provide houses to the eligible slum dwellers bringing them into the formal urban settlement. Slums so redeveloped should compulsorily be denotified.

Eligibility

- Slums, whether on Central Government land/State Government land/ULB land, Private Land, should be taken up for "in-situ" redevelopment for providing houses to all eligible slum dwellers.

- Eligibility of the slum dwellers like cut-off date etc. will be decided by States/UTs preferably through legislation.

Highlights

- Additional Floor Area Ratio (FAR)/Floor Space Index (FSI)/Transferable Development Rights (TDR) for making slum redevelopment projects financially viable.

- Slum rehabilitation grant of Rs. 1 lakh per house, on an average, would be admissible for all houses built for eligible slum dwellers in all such projects.

- Beneficiary contribution in slum redevelopment project, if any, shall be decided and fixed by the States/UTs Government.

- State/UT Governments and cities would, if required, provide additional Floor Area Ratio (FAR)/Floor Space Index (FSI)/Transferable Development Rights (TDR) for making slum redevelopment projects financially viable.

- States/UTs will have the flexibility to deploy this central grant for other slums being redeveloped for providing houses to eligible slum dwellers with private participation, except slums on private land. It means that States/UTs can utilise more than Rs. 1 lakh per house in some projects and less in other projects but within overall average of Rs. 1 lakh per house calculated across the States/UTs.

- The per house upper ceiling of central assistance, if any, for such slum redevelopment projects would be decided by the Ministry.

- States/UTs may decide whether the houses constructed will be allotted on ownership rights or on renewable, mortgageable and inheritable leasehold rights.

- States/UTs may impose suitable restrictions on transfer of houses constructed under this component.

- "In-situ" redevelopment of slums on private owned lands for providing houses to eligible slum dwellers can be incentivised by State Governments/UTs or ULBs by giving additional FSI/FAR or TDR to land owner as per its policy. Central assistance cannot be used in such cases.

- A viable project would have two components i.e. "slum rehabilitation component" which provides housing along with basic civic infrastructure to eligible slum dwellers and a "free sale component" which will be available to developers for selling in the market so as to cross subsidize the project.

Implementation/Approach for Slum Rehabilitation with Private Partnership is outlined as below:

- All tenable slums as identified in Housing for All Plan of Action (HFAPoA) of the city should be analysed with respect to their location, number of eligible slum dwellers in that slum, area of the slum land, market potential of the land (land value as per ready reckoner can be used), FAR/FSI available and density norms applicable to that piece of land etc..

- On the basis of analysis of slums, the implementing authorities should decide whether a particular slum can be redeveloped with private participation or not using land as a resource and to provide houses to eligible slums dwellers.

- For making projects financially viable, in some cases, States/UTs and cities might have to provide additional FAR/FSI or TDR and relax density and other planning norms. States/UTs may also allow commercial usage for part of the land/FAR as mixed usage of the land.

- States/UTs can also consider clubbing of nearby slums in clusters for in-situ redevelopment to make them financially and technically viable. Such cluster of slums can be considered as a single project.

- While formulating the project, the project planning and implementing authorities should also decide the area of slum land which should be given to the private developers. In some cases, the area of slum may be

more than what is required for rehabilitating all eligible slum dwellers plus free sale component for cross subsidizing the project. In such cases, project planning authorities should give only the required slum land to private developers and remaining slum land should be utilised for rehabilitating slums dwellers living in other slums or for housing for other urban poor.

- Slum dwellers through their association or other suitable means should be consulted while formulating redevelopment projects especially for the purpose of designing of slum rehabilitation component.

- The private developers who will execute the slum redevelopment project should be selected through an open transparent bidding process. The eligibility criteria for prospective developers can be decided by States/UTs and ULBs. The scope of work of the prospective developers should be to conceive and to execute the project as mandated by the Implementing agency using its financial and technical resources. The project developers would also be responsible for providing transit accommodation to the eligible slum dwellers during the construction period.

- All financial and non financial incentives and concessions, if any, should be integrated in the project and declared 'a priori' in the bid document. These incentives and concessions should also include contribution from beneficiaries/slum dwellers, if any.

Strategy for Slum Redevelopment using Land as a Resource
(Ref. Para 4 of the guidelines)

- Sale of "free sale component" of project should be linked to the completion and transfer of slum rehabilitation component to the implementing agency/state. Such stipulation should be clearly provided in the bid document to avoid any complication.

- Slum rehabilitation component should be handed over to implementing agency to make allotments to eligible slum dwellers through a transparent process. While making the allotment, families with physically handicapped persons and senior citizens should be given priority for allotment on ground floor or lower floors.

- Open bidding for the slum redevelopment project may result either into a positive premium or negative premium. In case of positive premium, the developer who offers the highest positive premium while satisfying all other conditions should be selected. In case of negative premium, the implementing authority may select the bidder proposing lowest negative premium. Funds required to make the project viable can be made available either from slum rehabilitation grant of Central Government or own fund of States and ULBs as well as positive premium received from other projects.

- Any private participation, that demands substantial grants from Government, may not be encouraged. Slums can either be taken up later for development or Kutcha/ unserviceable houses in such slums can be taken up under other components of the mission.

- States/UTs project planning and implementing authorities, ULBs should have a single project account for slum redevelopment project where positive premium, slum rehabilitation grant from Central Government,
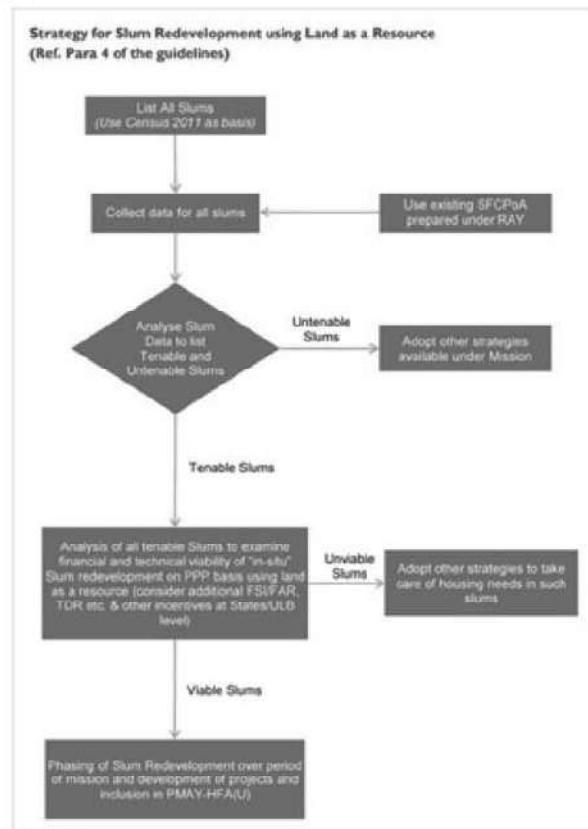
funds from State/UT Government or any other source is to be credited and used for financing all slum redevelopment projects with negative premium. Such accounts can be opened city-wise.

- Slum rehabilitation projects would require various approvals from different agencies as per prevailing rules and procedures in the States/UTs. Project development may also require changes in various development control rules. To facilitate such changes and for faster formulation and approval of projects, it is suggested that a single authority should be constituted with the responsibility to change planning and other norms and also for according approval to projects.

5.11.2.2 Credit Linked Subsidy Scheme for EWS/LIG (CLSS)

Pradhan Mantri Awas Yojana (Urban) - Housing For All Mission, in order to expand institutional credit flow to the housing needs of urban poor is implementing credit linked subsidy component as a demand side intervention.

- Beneficiaries of Economically Weaker Section (EWS) and Low Income Group (LIG) seeking housing loans from Banks, Housing Finance Companies and other such institutions would be eligible for an interest subsidy at the rate of 6.5 % for a tenure of 20* years or during tenure of loan whichever is lower.

- The credit linked subsidy will be available only for loan amounts upto Rs 6 lakhs and additional loans beyond Rs. 6 lakhs, if any, will be at nonsubsidized rate.

- Interest subsidy will be credited upfront to the loan account of beneficiaries through Primary Lending Institutions (PLI), resulting in reduced effective housing loan and Equated Monthly Installment (EMI).

- The Net Present Value (NPV) of the interest subsidy will be calculated at a discount rate of 9 %.

Home Ownership

The houses constructed/acquired with central assistance under the Mission should be in the name of the female head of the household or in the joint name of the male head of the household and his wife, and only in case when there is no adult female member in the family, the house can be in the name of male member of the household.

Coverage

All Statutory Towns as per Census 2011 and towns notified subsequently, including planning area as notified with respect to Statutory Town.

Purpose

New construction, acquisition and addition of rooms, kitchen, toilet etc. to existing dwelling houses as incremental housing.

Beneficiaries

- Beneficiary family will comprise husband, wife and unmarried children.

- The beneficiary family should not own a pucca house either in his/her name or in the name of any member of his/her family in any part of India.

- EWS Households having annual income up to Rs. 3,00,000/-

- LIG Households having annual income between Rs. 3,00,001/- and upto Rs. 6,00,000/-

- Preference under the scheme, subject to beneficiaries being from EWS/LIG segments, should be given to Manual Scavengers, Women (with overriding preference to widows), persons belonging to Scheduled Castes/ Scheduled Tribes/ Other Backward Classes, Minorities, Persons with disabilities and Transgender.

- Area which can be constructed

- Carpet area of house being constructed or enhanced under this component of the Mission should be upto 30 square meters for EWS category and upto 60 square meters for LIG category.

- Beneficiary, at his/her discretion, can build a house of larger area but interest subsidy would be limited to first Rs.6 lakh only.

- For incremental housing/extension, the area limit will be 30 sq.mt. and 60 sq.mt. of carpet area for EWS and LIG category respectively.

Subsidy and Loan details

- Maximum loan amount: as per eligibility of customer decided by bank / Financial Institution based on due diligence.

- Maximum loan tenure : based on the guidelines of the PLI.

- Maximum tenure for subsidy computation: 20* years or the tenure of the loan, whichever is lower.

- Maximum loan amount for subsidy calculation: Rs. 6 lakh.

- Interest rate for subsidy : 6.5%

Housing and Urban Development Corporation (HUDCO) and National Housing Bank (NHB) have been identified as Central Nodal Agencies (CNAs) to channelize this subsidy to the Primary Lending Institutions and for monitoring the progress of this component. This scheme will be implemented through Banks/Financial Institutions.

5.11.2.3 Affordable Housing in Partnership (AHP)

The third component of the Mission is Affordable Housing in Partnership which is a supply side intervention. The Mission will provide financial assistance to EWS houses being built with different partnerships by States/UTs/Cities.

Affordable housing projects are the projects where atleast 35% of houses are constructed for EWS category.

- To increase availability of houses for EWS category at an affordable rate, States/UTs, either through its agencies or in partnership with private sector including industries, can plan affordable housing projects.

- Central Assistance at the rate of Rs.1.5 Lakh per EWS house would be available for all EWS houses in such projects.

- The States/UTs would decide on an upper ceiling on the sale price of EWS houses in rupees per square meter of carpet area in such projects with an objective to make them affordable and accessible to the intended beneficiaries. For that purpose, States/UTs and cities may extend other concessions such as their State subsidy, land at affordable cost, stamp duty exemption etc.

- The sale prices may be fixed either on the project basis or city basis using following principles:

- An Affordable Housing Project (AHP) can be a mix of houses for different categories but it will be eligible for central assistance, only if at least
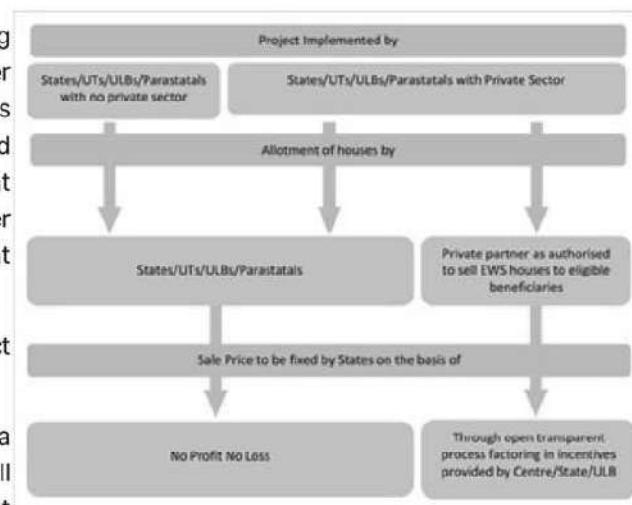
35% of the houses in the project are for EWS category and a single project has at least 250 EWS houses. CSMC at GOI level, however, can reduce the requirement of minimum number of houses in one project on the request of State Government.

- Allotment of houses to identified eligible beneficiaries in AHP projects should be made following a transparent procedure as approved by SLSMC and the beneficiaries selected should be part of HFAPoA.

- Preference in allotment may be given to Physically Handicapped Persons, Senior Citizens, Scheduled Castes, Scheduled Tribes, Other Backward Classes, Minority, Single Women, Transgender and Other Weaker and Vulnerable Sections of the Society.

- While making the allotment, the families with person with disability and senior citizens may be allotted house preferably on the ground floor or lower floors.

- Detailed Project Report (DPR) of such projects prepared by concerned implementing agencies should be approved by SLSMC.

Coverage

- All statutory towns as per Census 2011 and towns notified subsequently would be eligible for coverage under the Mission.

- The Mission will support construction of houses upto 30 square meter carpet area with basic civic infrastructure.

- States/UTs will have flexibility in terms of determining the size of house and other facilities at the State/UT level in consultation with the Ministry but without any enhanced financial assistance from Centre.

- Affordable Housing Projects in partnership should have basic civic infrastructure like water, sanitation, sewerage, road, electricity etc.

- The minimum size of houses constructed under the Mission under each component must conform to the standards provided in National Building Code (NBC).

- The houses under the Mission should be designed and constructed to meet the requirements of structural safety against earthquake, flood, cyclone, landslides etc. conforming to the National Building Code (NBC) and other relevant Bureau of Indian Standards (BIS) codes.

- All houses built or expanded under the Mission should essentially have toilet facility.

- The houses constructed/acquired with central assistance under the Mission should preferably be in the name of the female head of the household or in the joint name of the male head of the household and his wife.

- Only in cases when there is no adult female member in the family, the house can be in the name of male member of the household.

Implementation

A beneficiary will be eligible for availing only a single benefit under any of the existing options i.e. Slum Redevelopment with Private Partner, Credit Linked Subsidy, Direct Subsidy to Individual Beneficiary and Affordable Housing in Partnership. It will be the responsibility of States/UTs Government to ensure that the beneficiary is not given benefit under more than one component of the Mission.

5.11.2.4   Beneficiary Led Construction (BLC)

Beneficiaries could avail the benefits of scheme component for New construction and Enhancement of existing house. Highlights of 'Beneficiary Led (Individual House) Construction' or Enhancement (BLC) Progress to be tracked through geo tagged photographs of the house.

Eligibility for New Construction

- Urban residents of EWS : Economically Weaker Section (annual income upto Rs 3 lakhs) & LIG: Low Income Group (annual income Rs 3 to 6 lakhs).

- Beneficiary families should not own a pucca house anywhere in India.

- For BLC Enhancement

- Beneficiaries may be residing either in slums or outside the slums.

- Beneficiaries in slums which are not being redeveloped can be covered under this component if beneficiaries have a Kutcha or Semi-Pucca house.

Benefit

- To individual eligible families belonging to EWS categories, to either construct a new house or enhance existing house on their own to cover the beneficiaries, who are not able to take advantage of other components of the mission.

- Such families may avail of central assistance of Rs. 1.50 lakhs for construction of new house or for enhancement of existing house under the mission.

Why Enhancement

- As per the Technical Group on Urban Housing Shortage (2012-17), 80% of households are living in congested houses.

- Congestion factor is defined as the percentage of households in which each married couple does not have a separate room to live.

Provisions related to enhancement in PMAY(U) Guidelines

As per clause 7.2 (b) of PMAY(U) guidelines:

"If the beneficiary has a pucca house with carpet area of up to 21 sq. mt. or a semi-pucca house, lacking in one of the facilities (i.e. room, kitchen, toilet, bathroom or a combination of any of these), it may be taken up for enhancement subject to ULB/State ensuring structural safety of the house and adherence to following conditions:

- The total carpet area after enhancement must not be less than 21 sq mt and must not be more than 30 sq mt.

- Enhancement shall mean addition of minimum carpet area of 9.0 Sq Mt into the existing house with pucca construction of at least one habitable room or room with kitchen and/or bathroom and/or toilet conforming to NBC norms.

- The details of the enhancement proposals under BLC vertical shall be submitted in proposed Annexure 7D of the PMAY (U) guidelines."

5.12 STRATEGIES FOR HOUSING & INCLUSIVE DEVELOPMENT

The housing strategies adopted for the Master Plan – 2045 is based on the principles of densifying areas where there is ample infrastructure available and land is available for residential development. Through the development control regulations, the authority intends to promote mid rise development to optimize the utilization of land and infrastructure and increase the housing stock in the planning area at minimum infrastructure cost to the government. The authority has adopted the mixed use land use to promote residential use adjacent to the employment centers and in areas where the employment centers are absent or in areas far from the residential areas, the authority has tried to bring in employment generating landuses in an attempt to strengthen these areas and promote better housing options nearby for the local population.

Providing residence adjacent to the employment center safeguards the interest of Economically weaker sections who prefers to stay closer to work and avoid transportation cost. It is also advised through the Master Plan-2045 to promote affordable housing by earmarking land for residential projects for economically weaker sections of the planning area.   Through Master Plan - 2045 the authority has identified the new conurbation for 2045 which forms a continuous development with residential as a major land use to address the major housing requirements of the planning area.   This also enables the merger of unplanned development taken place during the last few decades into main urban development of the planning area with proper circulation network and basic infrastructure.
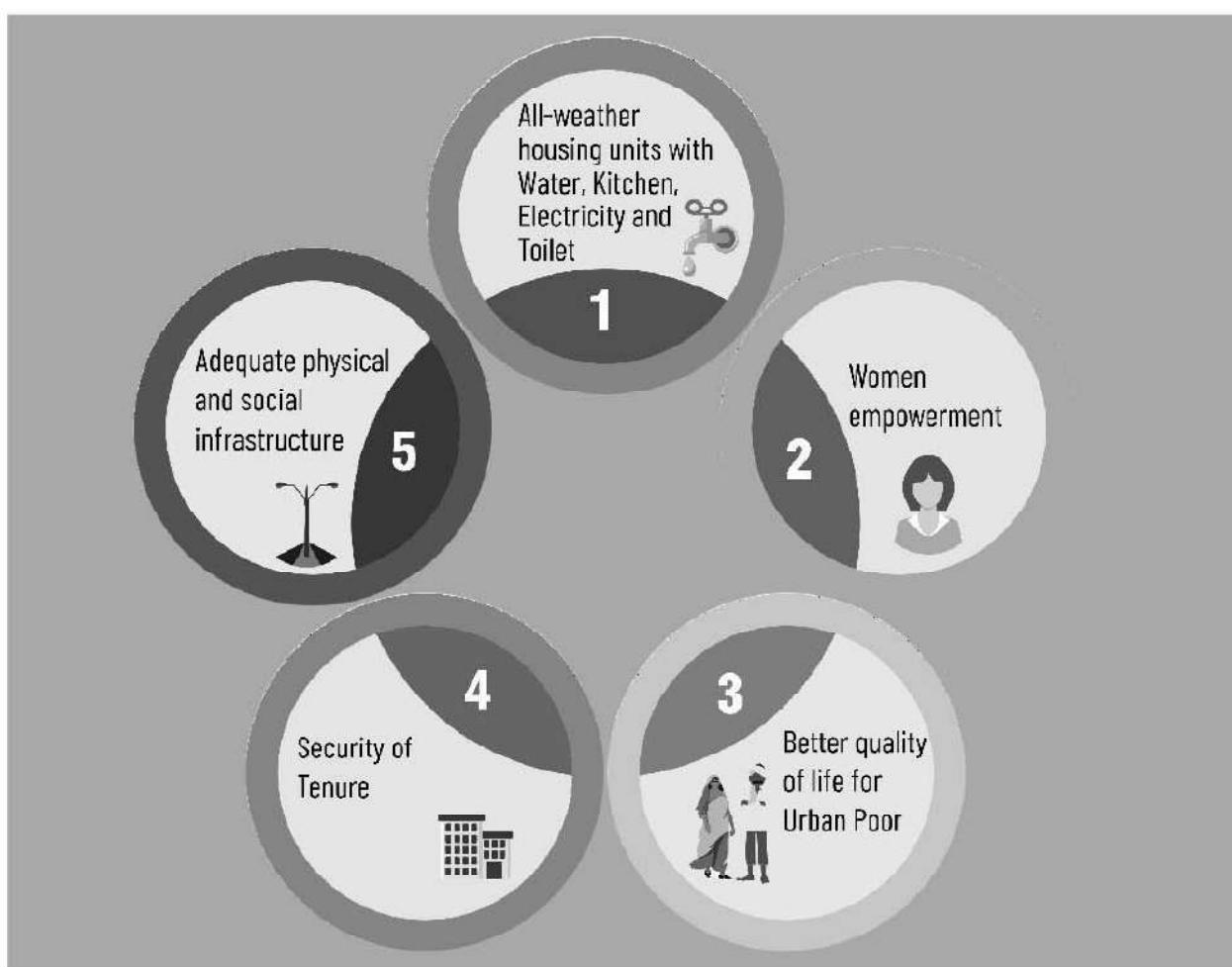
6 TRANSPORTATION

Transportation plays a vital role towards the mobility of people as well as goods & services of a particular system. People are always mobile, and mobility is most important dynamic functions of a city which is having more bearing towards the economic development. In the absence of mobility due to improper transportation system the city functions would be paralyzed which may affect the dynamism of the system.

For the healthy growth, economic prosperity and improved living standards of any area, a high-quality transportation network is essential. In addition, transportation and landuse are to be integrated to achieve reduction in trip length, increase in public transport usage etc.

6.1 TRANSPORTATION NETWORK

6.1.1 REGIONAL CONNECTIVITY OF SILCHAR

Silchar is well connected to North Eastern major cities like Imphal, Agartala, Aizwal, Shillong, Nagaon, Guwahati through National Highways - NH 37, NH 306 and State Highways. The major metropolitan area connected to the planning area is Guwahati and it is easily reachable by roadways through NH-6 and NH-27. Silchar to Guwahati bus services are also available.

6.1.1.1 Interstate Connectivity (From Silchar)

Silchar is connected to major cities of Assam and other states of India by road and rail. Table 91 manifest the time taken (in hrs.) and distance (in km) from Silchar to important cities of Assam and other states by different modes of transportation.

Table 91 Interstate modes of transportation from Silchar

Connectivity from Silchar	Distance (km)	Time (hrs.)		
		By Road	By Rail	By Air
Itanagar	531	15 hrs	14 hrs	-
Kohima	356	13 hrs	9 hrs	-
Imphal	253	9 hrs	6 hrs	-
Aizawl	172	7 hrs	6 hrs	-
Shillong	220	7 hrs	15 hrs	-
Guwahati	314	9 hrs	10 hrs	1 hrs
Siliguri	771	19 hrs	18 hrs	4 hrs
Gangtok	836	22 hrs	21 hrs	5 hrs
Nagaon	317	10 hrs	8 hrs	-
Dibrugarh	553	17 hrs	13 hrs	16 hrs

(Source: Compiled by Consultants)

Aizwal is the nearest major city from Silchar which covers minimum distance i.e. 172 km compare to other important urban centers. Other important cities of different states like Kohima, Imphal and Shillong are accessible from Silchar which takes approx. 7-15 hrs by road. Siliguri is far away from Silchar that takes 19 hrs to reach by road journey, however other modes of transportation is also available in this case. Figure 86 represents geographical connectivity of Silchar to other state regions.

6.1.1.2 Intercity Connectivity (From Silchar)

Silchar has the intercity connectivity by road as well as by rail. The table no. 92 below shows the various modes of transportation and its connectivity with the nearest cities like Lakhipur, Sonai, Udharbond, Dorgah kona, Dalu and Katakhal. The minimum connecting distance is 15 kilometers from Udharbond to Silchar and maximum is 29 kilometers from Lakhipur.

Table 92 Intercity modes of transportation from Silchar

| Urban centres from Silchar	Distance (km)	Duration (in hrs)	
		By Road	By Rail
Lakhipur	29	1 hrs	-
Sonai	18	37 min	-
Udharbond	15	31 min	-
Katakhal	19	36 min	34 min
Dorgah kona	20	47 min	-
Dalu	25	36 min	-
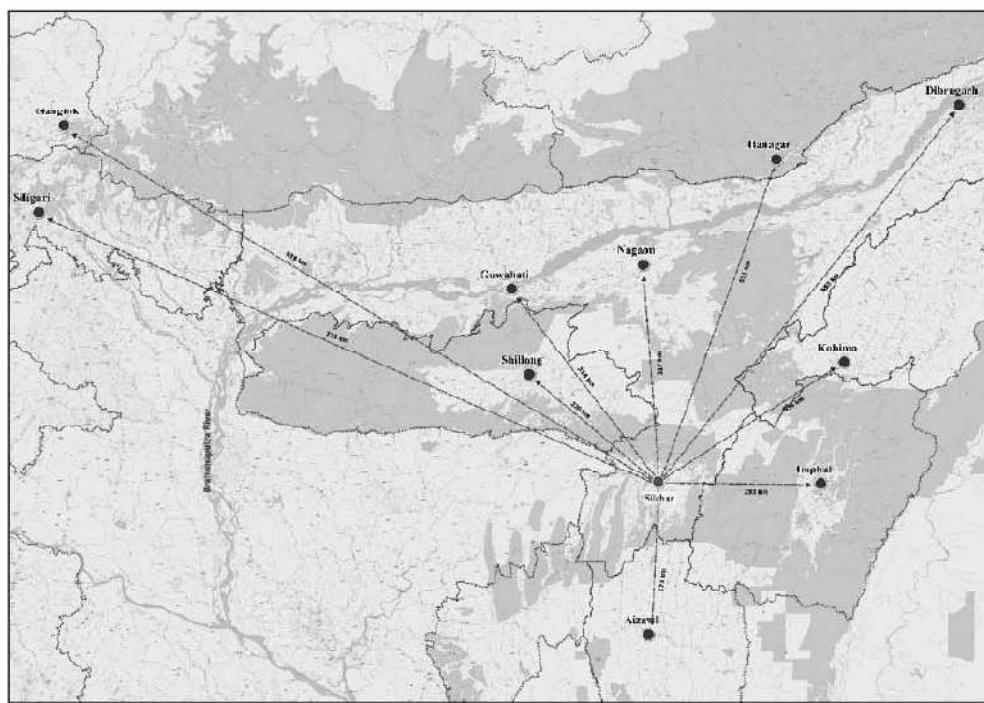
Figure 86 Interstate Connectivity from Silchar district

(Source: Compiled by Consultants)
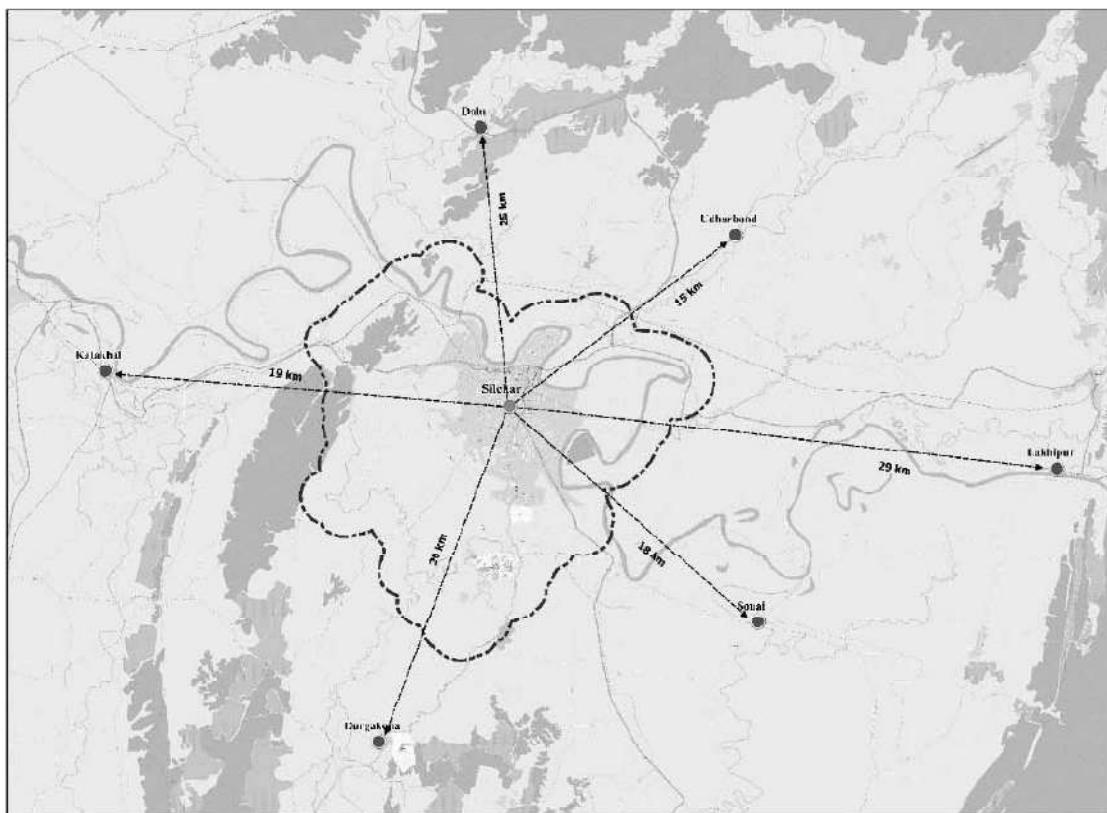
Figure 87 Intercity connectivity   (Source: Compiled by Consultants)

6.1.2 RAILWAYS

Silchar is connected by Indian Railways network. There are several trains plying between Silchar and Guwahati. Silchar is connected by a broad gauge rail network to Agartala and lumding. It is being upgraded to broad gauge lines in Tarapur. Places connected to Silchar by railways are Hailakandi, Karimganj, Jiribam and Vairobi. Important Trains like Cachar Express, Barak Valley Express, Cachar Express, Barak Valley Express runs at regular intervals to and from Guwahati.

6.1.3 AIRWAYS

Airport was a major infrastructure introduced under the regime of Mr. Santosh Mohan dev, for the development of Silchar. Almost 32 flights depart from Silchar to cites like Guwahati, Imphal, Agartala and Kolkata, per week. Making it the second busiest airport in Assam and fourth busiest in North-east region, in terms of both passenger foot fall and cargo. Approximately 599 persons fly in and out of the airport and .95 tonnes of cargo is shipped out on a day-to-day basis. (Source: Statistical Handbook, Assam (2013)

6.1.4 EXISTING ROAD NETWORK

To understand the demand-supply gap and accordingly to assess the improvement requirements of the study area a detail analysis of existing transport facility characteristics is necessary. As existing traffic and travel characteristics introduces the transport system demand, existing transport facility characteristics summarize the system supply. Appreciation of road network characteristics is important to assess existing capacity of the roads, identify the constraints, if any, and assess the potential for improvement/up gradation of the road network to cater the existing and projected traffic demand. For the present study, a detailed inventory of major road network has been carried out. The road network inventory data was analysed in terms of parameters like length of road, carriageway, width of footpath / shoulder, no. of lanes etc.

6.1.4.1 Primary Road Network

Silchar is mainly connected to other important destinations by NH-37, NH-306, SH-38, and SH-39. National Highway-37 and 306, in broad context, are primary NH which connects Silchar to Northern and Southern States of Assam and contributes majorly in Silchar economic development by its connectivity to important trading nodes. NH-37, within SMPA traditionally famous as Lumding-Silchar road, enters from Srikona gaon from West and by criss-crossing Silchar urban agglomeration through Tarapur and city core centre it further connects Rongpur and finally heads towards Badripar gaon in East as Manipur Road. NH 306, splitting from NH-37 at Sadarghat Point, enters Silchar town area which is traditionally famous as Club road and by further connecting Nazirpatty, Fatak Bazar, Ambicapatty and Janiganj Bazar it diverts towards Mizoram in south-east from Rangirkhari junction. Another important highway is NH 27, which links Silchar to southern urban centres and towns like Lumbding and Diphu by splitting from NH-37 at junction near Berenga gaon. Other than NH, SH-38 and SH-39 connects Silchar to nearby important towns and urban nodes.

6.1.4.2 Secondary Road Network

Silchar Urban Area is connected to its adjoining regions mainly via nine Major City road. They are:

1. Khatal Road (SH-39 (Maherpur road) to Khatal village)

2. Chaengkri Road (Satsang Ashram road to Silchar Bypass Link Road)

3. Ambikapatty Road (NH-306(Ambikapatty point) to Vivekanand road Junction)

4. Old Lakhipur road (Fatak Bazar to Barak River)

5. Park Road (India club Junction to NH-306)

6. CR Ave Road (NH-37to NH-306 Link road)

7. Satsang Ashram Road (Vivekanand road to CR Ave road)

8. Vivekanand Road (Jail road to Satsang Ashram Road)

9. Narshing Tola (NH-306 to Park road, Link road)

6.1.4.3 Tertiary Road Network

The tertiary road network consists of all the city roads and village roads and link roads which connect the rest of the settlements in the Planning Area. These roads connect the settlements along various contours and hilly undulating terrain.

But the road network in the town can be described as poor, not in terms of linkages but maintenance. There are regular bus and sumo services connecting Silchar by road with Guwahati, Shillong, Aizawl, Agartala and other places.

6.1.4.4 Existing Municipal Road Network

Road network of Silchar consist of 38.77 km under P.W.D. Rural division, 28.4 km under P.W.D. NH Division (under NH 37 a length of 19.6 km from Srikona to Badripar point and under NH 306 a length of 8.8 km). Total 139.46 km (constituted of lanes and by-lanes) road network built under the Silchar Municipal Board, out of which 26.93 km is concrete road, 17.11 km bitumen road, 4.2km WBM road 1.6 km Stone road, 12.31 km Gravel road and 76.89 Earthen Road. Ward number 5 has the largest number of lanes and by lanes combined together amounting to 77 followed by ward number 19 with 74. Ward number 14 has the largest road length of 10632.20 meters followed by ward number 17 with 10628.80 meters.

Table 93 Number of Lanes and by Lanes Ward wise

Ward No.	Number of Lanes and By Lanes (Combined)	Road Length (Meters)	Ward No.	Number of Lanes and By Lanes (Combined)	Road Length (Meters)
1	33	3490.05	15	15	3472.22
2	43	4845.34	16	23	10062.5
3	56	7375.9	17	60	10628.8
4	33	3695.45	18	46	7755.2
5	77	9922.05	19	50	6119.3
6	12	1137.45	20	29	3280.7
7	24	2143.43	21	26	2840.7
8	29	2048.3	22	32	3406.6
9	19	2353.8	23	18	1113.3
10	17	1908.9	24	18	2805.2
11	18	2234.6	25	48	5791.55
12	31	4044.4	26	54	8436.78
13	26	3775.1	27	33	5998.22
14	56	10632.2	28	26	4717.07

(Source: Silchar Municipal Board, Silchar)
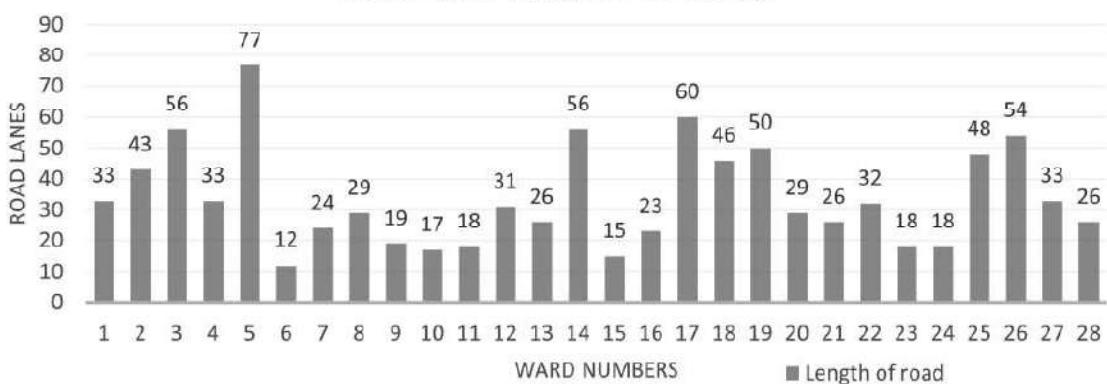
Figure 88 Ward wise road lanes

(Source: Silchar Municipal Board, Silchar)

Figure 89 Ward wise road length

(Source: Silchar Municipal Board, Silchar)

Silchar Master Plan Area
Transport Network

Scale 1:23,032

Legend:
- Master Plan Area
- Ward Boundary
- Primary Road (NH)
- Primary Road (SH)
- Secondary Road
- Tertiary Road
- Railway Line
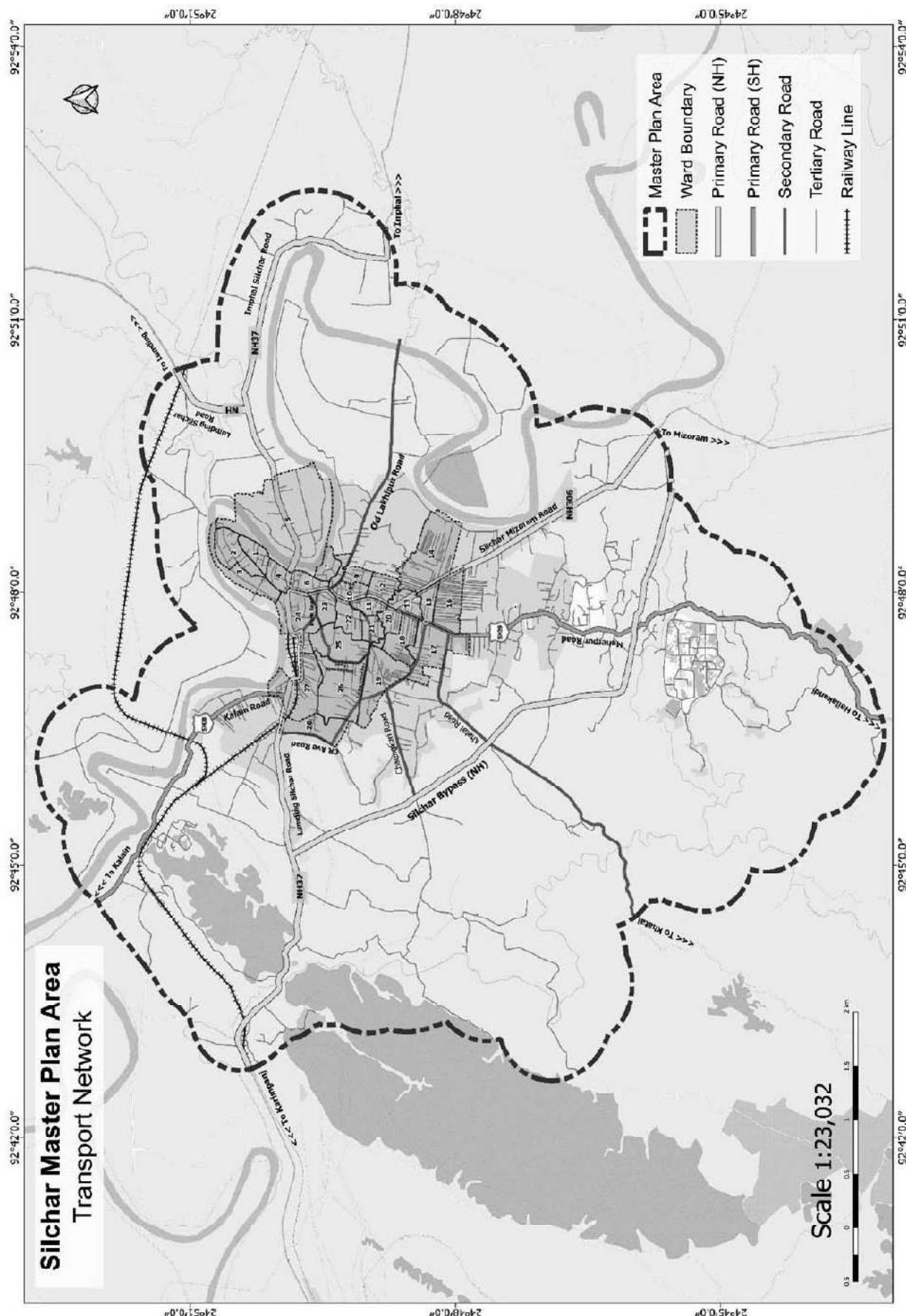
Figure 90 Transport network of Silchar MP area

6.1.5 ROAD INVENTORY

Road network of a city gives idea of the hierarchy of roads present in the city. The hierarchy of city is based on different widths of the roads. It also tells that which road perform which type of function like arterial road, sub-arterial road, collector streets or access roads. It is important to identify higher hierarchy roads as they are major transit corridors of any city. Road inventory is depicted in the figure 91 which includes all the highways, major roads, minor roads, private/public roads, village roads etc. The whole network shows the road connectivity in the city.

6.1.5.1 Road Hierarchy

The highways which pass through the Planning Area connects Silchar to nearby cities. Except Highways and few other roads, majority of the roads in the Planning area are having a carraige way less than 12m. For example, the roads running across key commercial areas such as Club road, Central road, Ambikapatty road, Park Road, Narshing Tola and Tula Patty are too congested, and this leads to increased travel time within the city and deterioration in quality of life in these important nodes of the planning area.

The roads in the Planning area are shown in the fig 91 in different categories with respect to their RoW. The RoW in the planning area varies from 6 mt to 45 mt. It can be observed from the fig 91 that some of the important roads such as NH-37 do not have a uniform right of way and carriage way. In Assam, NH-37 has a right of way of 15 mt but increases to 20 mt as it crosses the Sadarghat point junction in Silchar and heads towards Rongpur gaon. It further reduces the width from 20 mt to 15 mt from Rongpur gaon to Badripar gaon. If we observe NH-306, it has continuous 15 mt R.O.W and 7 mt Carriage Way width throughout MPA but major patches of NH-306 is generally found encroached by unauthorized parking of Two-wheelers, Three-wheelers, and e-rickshaws on both sides of road resulting from blooming of un-organized retail sectors in central patches which leads to reduced accessible width of carriageway only up to 4-5 m in pick hours. SH-39, runs from Rangirkhari point by splitting from NH-306, mostly known as Meherpur Road, is having 20 mt of RoW up to Khatal road point with 4 lane carriage way. However, it reduces to 8 mt up to Birbal bazar and then remains for 6 mt only throughout length. Proposed Silchar Bypass consisting 45mt of RoW which is a part of highway under execution and will decongest the core city area through bypassing the traffic.

6.1.5.2 Major Regional Roads

National Highway (NH)

National Highways passing through the Silchar Planning Area along with its length, width and number of lanes are presented in table 88. NH-37 enters from West at Srikona gaon in SMPA further meets NH-306 at Central junction and heads towards Ronpur Gaon in East through Rangirkhari junction. Another is the NH-306, known as Central Road, Club Road and Mizoram road starts from junction at Central point by splitting from NH-37 it exits at Saidpur from SMPA in South. Additionally, Silchar bypass links NH-36 to NH-306 by connecting the urban roads like Chaengkuri and Khatal Road.

Table 94 List of National Highways passing through Silchar planning area

Sl. No.	Name of the road (NH)	Type of road	Length of the Road (km)	R.O.W (m)	C.W. (m)	Shoulder+ footpath width for one side (m)	No. of lanes
1.	Lumding Silchar Road (Srikona to Tarapur)	NH 37	10.2	15	8	3.5	2
2.	Manipur Road (Tarapur to Berenga pt 4)	NH 37	3.2	20	15	2.5	4
3.	Imphal Silchar Road (Rongpur to Badripar)	NH 37	6.2	15	7	13	2
4.	Silchar Mizoram Road (Tarapur to Nagatilla)	NH 306	8.8	15	7	4	2
5.	Lumding Silchar Road (Rongpur)	NH 27	1.8	25	7.5	3	4
6.	Silchar Bypass Rod (NH)	NH	11	45	10	12.5	2

(Source: Silchar Municipal Board, Silchar)

State Highway (SH)

The table 89 describes the State Highway passing through Silchar Planning area with parameters like width of carriage way, its length and number of lanes. The SH-38 is one of the prime roads which enters SMPA from north and meets NH-37 at Kalain road point. It carries the traffic from villages like Tarapur, Kumarpara, Burunga and Lakhipur and connects them to Silchar railway and ISBT, Silchar from Upper north portion. The total length falls under SMPA of SH-38 is 6.1 km where certain width variation observed throughout the length. SH-39 is another important state highway which connects Silchar from its city area to nearby Northern towns like Masimpur, Silikuri, Silikuri Grant and the total length of falls within SMPA is 13.5 km.

Table 95 List of State Highway passing through Silchar planning area

Sl. No.	Name of the road (SH)	Type of road	Length of Road (km)	R.O.W (m)	C.W. (m)	Shoulder+ footpath one side (m)	No. of lanes
1.	**Kalain Road** (Tarapur to Balighat)	SH 38	6.1	15	10	2.5	2
2.	**Meherpur Road** (Rangirkhari point to Katalpoint)	SH 39	1.3	20	14	3	4
3.	**Meherpur Road** (Khatalpoint to Birbal Bazar)	SH 39	1.6	16	8	3.5	2
4.	**Meherpur Road**	SH 39	10.6	10	6	2	2

(Source: Silchar Municipal Board, Silchar)

6.1.5.3 Major Roads

The major roads are the means to serve and connect all the areas in the city and to villages. As per IRC, the roads which are having road width greater than 10 m are counted as Major roads. Following are the roads which fall under this category as per IRC guideline.

Table 96 List of Primary roads of Silchar MP area

| Sl. No.	Name of the Roads (Major Roads)	Length of Road (km)	R.O.W (m)	C.W. (m)	Shoulder+ footpath one side (m)
1.	CR Avenue	4.3	15	6	2.5
2.	Vivekananda Road	1.6	10.5	5.5	2.5
3.	Park Road	1	10	6	2
4.	Old Lakhipur Road	3.36	12	5	3
5.	Ambicapatty Road	0.57	13	7	3
6.	Satsang Ashram Road	1.48	13	7	3
7.	Narshing Tola	0.26	10	8	1
8.	Chaengkuri Road	3	10	6	2
9.	Khatal Road	7.5	10	6	2

(Source: Silchar Municipal Board, Silchar)

6.1.5.4 Urban Roads

All rest road network including street road, village road and other roads and counted as tertiary roads. Below in table 97 mentioned are the roads fall under this category.

Table 97 List of tertiary roads within SMPA

Sl. No.	Name of the Roads	Length of the Road (Km)	C.W. (mt)	Shoulder+F.P. One sided
1.	Panchayet Road	1.5	5	0.5
2.	Church Road	0.7	6	1
3.	Fatak Bazar	1.33	6	1
4.	Mela Road	1.06	7	1.5
5.	Itkhola Road (Hijam Irabot to Manipur Para)	0.5	7	1.5
6.	Shillong Patty	0.4	7	1.5
7.	SS Paul Road	0.13	7	1.5
8.	Tula Patty	0.18	6	0.5
9.	Water works Road	0.2	7.5	0.5
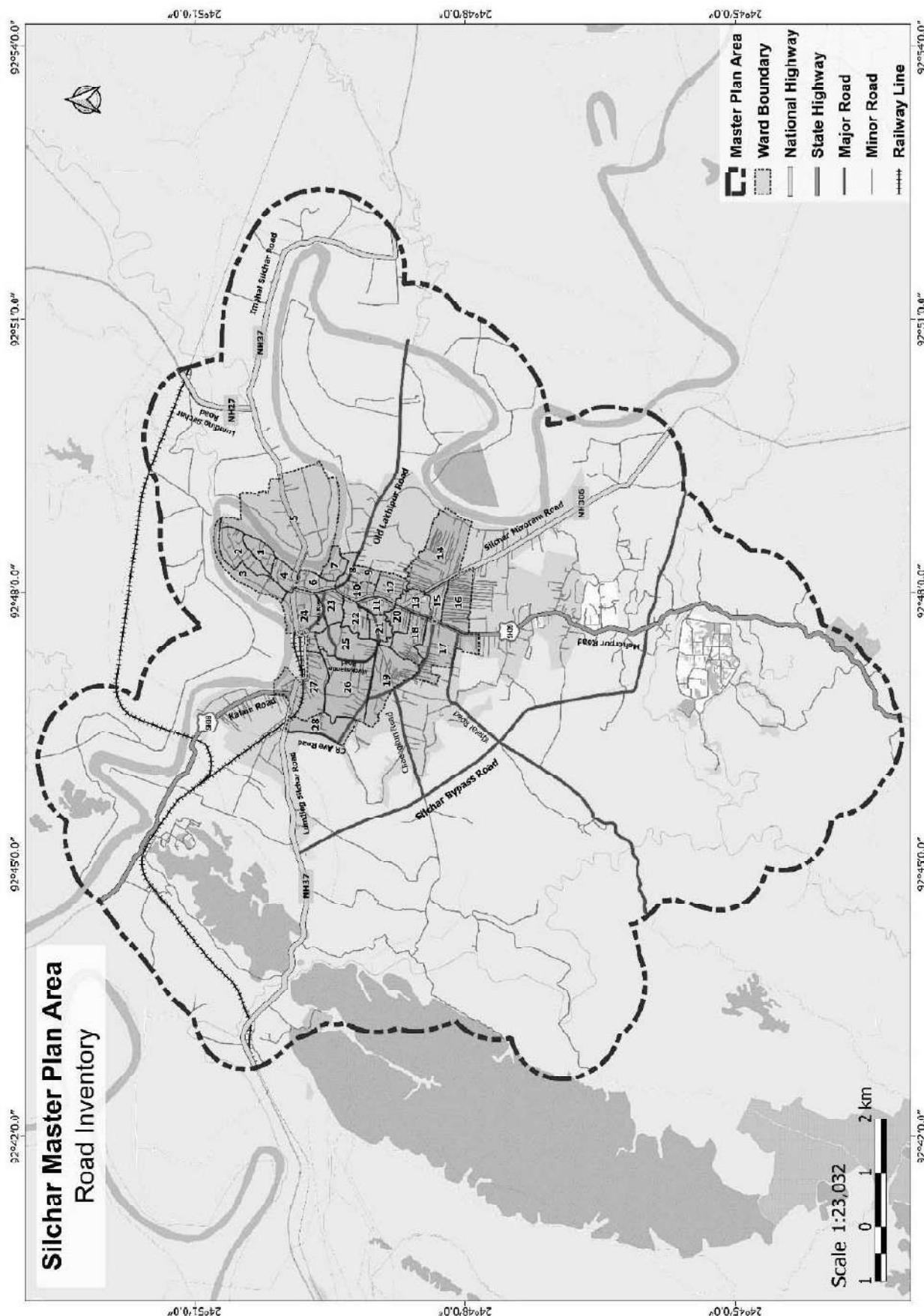
Figure 91 Road inventory map of Silchar MP area

6.2 VEHICLE REGISTRATION

Vehicle registration is essential to establish link between a vehicle and an owner or user of the vehicle. In the table 98 given below, categories of public and private vehicles along with their number is mentioned. The information has been provided by the District Transport Office, Silchar. The categorization has been done based on transport and non-transport use. Further in table 98, the number of vehicles is depicted in LMV (light motor vehicles) and HMV (heavy motor vehicles).

Table 98 Growth of first moving vehicle

No. Of Vehicle, Class wise (from Jan 2015 to Dec 2020)

Sr.No.	Vehicle Class	Total
1	Agriculture Tractor	2
2	Ambulance	66
3	Articulated Vehicle	48
4	Auxiliary Trailer	207
5	Bus	135
6	Construction Equipment	12
7	Crane Mounted Vwhicle	11
8	Dumper	1955
9	Earth Moving Equipment	2
10	e-Rickshaw (P)	1372
11	Excavator (COmmercial)	280
12	Excavator (NT)	14
13	Fire Fighting Vehicle	2
14	Fork Lift	2
15	Goods Carrier	5268
16	Maxi Cab	22
17	M-Cylce/Scooter	77324
18	M-Cylce/Scooter – with side car	12
19	Moped	651
20	Motor Car	799
21	Roller	3
22	Three wheeler (Goods)	354
23	Three wheeler (Passenger)	10460
24	Tractor (Commercial)	321
25	Trailor (Agricultural)	30

(Source: DTO, Silchar 2020)

In Silchar Urban area the vehicles are categorized into two different classes which are Transport (T) and Non-Transport (NT) Vehicles. As per District Transport Office of Cachar District the data has been collected for urban areas.

Table 99 LMV and HMV

Sr. No.	Vehicle Category	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	Jan-2020
1	Heavy Goods Vehicle	247	332	304	298	492	248
2	Heavy Motor Vehicle	-	2	-	1	1	1
3	Heavy Passenger Vehicle	12	2	7	3	2	2
4	Light Goods Vehicle	517	661	740	1506	1342	1175
5	Light Motor Vehicle	1859	1908	2526	3209	3323	2960
6	Light Passenger Vehicle	108	134	163	263	244	49
7	Medium Goods Vehicle	13	14	63	38	53	47
8	Medium Motor Vehicle	-	-	-	-	3	7
9	Medium Passenger Vehicle	10	5	8	4	2	1
10	Three-Wheeler (T)	1863	1477	1335	3195	3020	1302
11	Two-Wheeler (NT)	9636	10569	12391	15703	15605	14081
12	Other than Mentioned above	6	4	4	6	5	2

(Source: DTO, Silchar 2015-20)

It is observed that Non-Transport vehicles are more than the number of Transport vehicles in Silchar urban areas.

6.3 PUBLIC TRANSPORT

6.3.1 PUBLIC TRANSPORT AND ROUTES

The town has both railway and bus terminus which increases the chances of trade and commerce with other towns and free flow movement of people from one place to another. Public transport points as Railway Stations, ASTC Bus terminal, Bus Stand, Bus Stops, Auto stand, and taxi stands are mentioned in the fig 92 below.

Silchar Master Plan Area
Public Transport

Legend:
- Railway Station
- Taxi Service
- Auto Stand
- Taxi Stand
- Helipad
- Bus Stand
- Bus Terminus
- Ferry Ghat
- Master Plan Area
- Ward Boundary
- National Highway
- State Highway
- Major City Road
- Minor Road
- Railway Line
- Major Railway Station

Scale 1:10,807

0   1 km
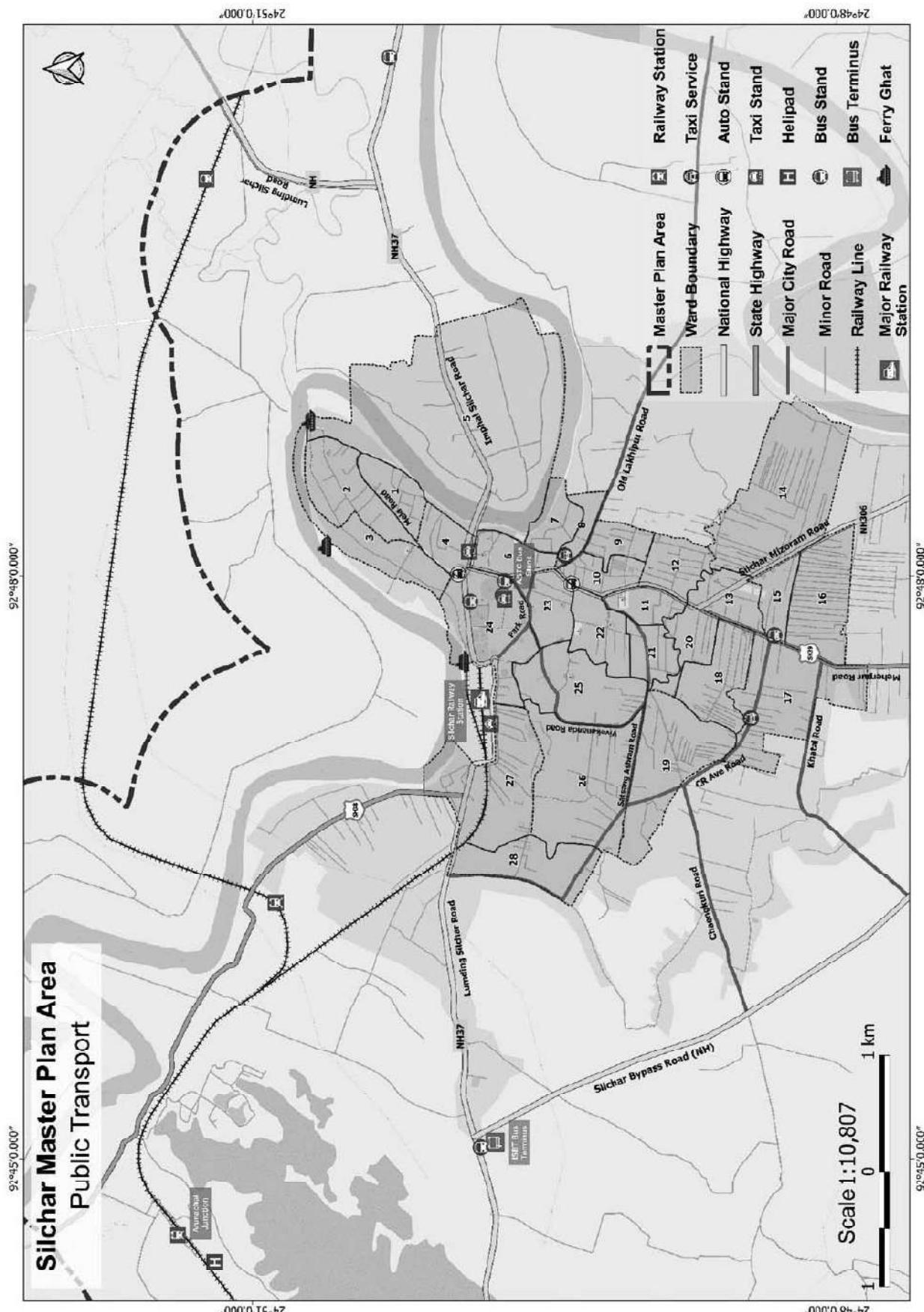
Figure 92 Public transport in Silchar MP area

6.3.1.1 Bus Terminals

The Assam State Transport Corporation (ASTC) bus depot operates in the city to connect to nearby cities of the district and other major cities of the state, like Guwahati, Shillong. There are regular bus services connecting Silchar by road with Guwahati, Shillong, Aizawl, Agartala and other places.
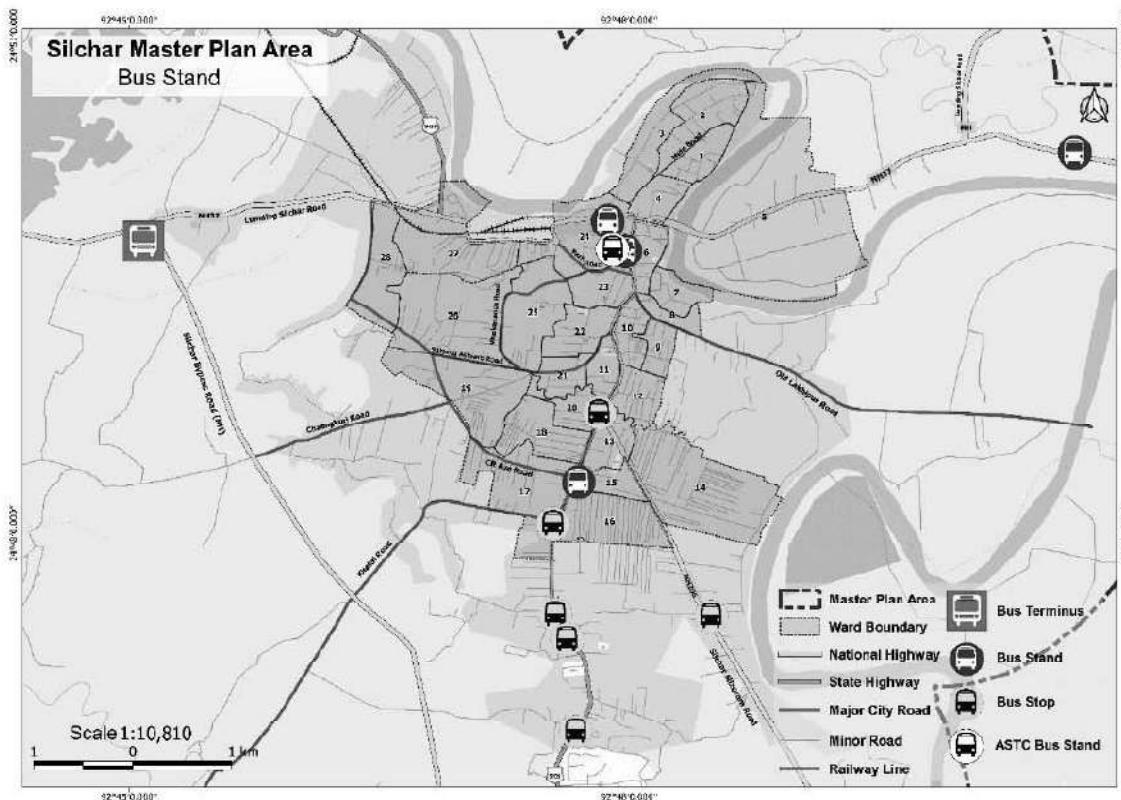
Figure 93 Bus stands in SMPA

The main roads are defined transport corridors in the city. Therefore, primary emphasis should be on consolidation of existing networks and then expanding it; bus depots proposed at suitable intervals along with the other infrastructure for the bus system. Existing bus stops lacks the same. In the integrated transport network

ISBT, Silchar

ASTC, Bus Stand, NH 306

concept, terminals are very important components as they enable integration between the different modes of the system.

Expect the existing A.S.T.C bus terminus located in the heart of the town, the other public and private Bus stands are most temporarily located at some busy roadsides which causes the traffic congestion and traffic. The bus stands located at different places of the town and their characterstics are as given below

Table 100 Bus stations in Silchar city

Terminal Centre	Location	Observations
A. Inter city	Bus station	
1. Passenger	ISBT, Silchar	Located at Bajantipur on NH-37. Campus of the bus station requires passenger landing boarding platform facility. Inadequate sanitation and basic amenities. All the necessary facilities should be improved providing modern technology through proper planning.
	A.S.T.C bus station, Chittaranjan Statue, Meherpur Road	Located on NH-306, Unorganized parking space. No shade for waiting area, toilet facilities should be extended. Passengers guest house facilities should be provided.
	A.S.T.C bus station, Devdoot Point	Located at Devdoot point, Small and contemporary parking space. No shade for waiting area, toilet facilities should be extended. Passengers guest house facilities should be provided.
B. Inter city	Railway stations	
	Silchar railway station	Railway station should be developed providing all modern facilities. Platform awaiting shed should be upgraded. Guest house facilities should be established.
	Arunachal railway station	Platform with Small shade area. There is no waiting place on the platform. Toilet and sanitation facilities are very negligible. Booking and Reservation counters inadequate. Height of the platform should be raised. At all, the platform is required to be upgraded providing all modern facilities.

6.3.1.2 Railway Station

The Lumding, Badarpur section of NF is the most vital link of Cachar Mizoram and Tripura with the rest of the country. The total railway route length in the district is 201 kilometers of BG route length from Lumding to Silchar and 215 kilometers of meter gauge route length from Lumding to Silchar. The district has no steamer service as there is no demand for the same. (District Report Cachar-Indian Council of Social Science).

Silchar has three railway stations and that has been mentioned in the table 101 below with the location. These stations are serving both passenger transportation as well as Freight transportation.

Table 101 Railway station in Silchar master plan area

Railway Station	Location
Silchar Railway Stationn (Major)	Tarapur, Silchar
New Silchar Station	Rongpur II, Silchar
Arunachal Railway Station	Tarapur Pt I, Silchar

6.3.1.3 Major Bus Stop

The major bus stop in the city has been mentioned in the table 96 described below. This bus stop is in the Master plan area.

Table 102 Major Bus Stops of Silchar MP Area

Bus Stop	Location
Rangirkhari	Rangirkhari Circle, Silchar
ASTC bus stop	Devdoot point, Park road, Silchar
Khatal Road	Khatal Point, Meherpur Road, Silchar

(Source: Compiled by Consultants)

6.3.1.4 Freight Zones & Logistics

Table 103 Freight zones and logistics

Logistics	Communication Hubs	Railways
- Inland World Logistics	- All India Radio	Silchar Junction
- Ekart Logistics		New Silchar Junction
- Myntra Logistics		
- Delhivery Courier	-BSNL Assam Telecom Circle, Silchar	Arunachal Junction
- Akash Ganga Courier		
-Flyking Courier ,Aramex Courier		

Silchar Master Plan Area
Freight and Logistics Map

Legend

- Master Plan Area
- Ward Boundary
- National Highway
- State Highway
- Major City Road
- Minor Road
- Railway Line
- Major Railway Station

- Communication Hub
- Warehouse
- ASTC Bus Stand
- Bus Stand
- Bus Stop
- Bus Terminus

Scale 1:10,811

2 km
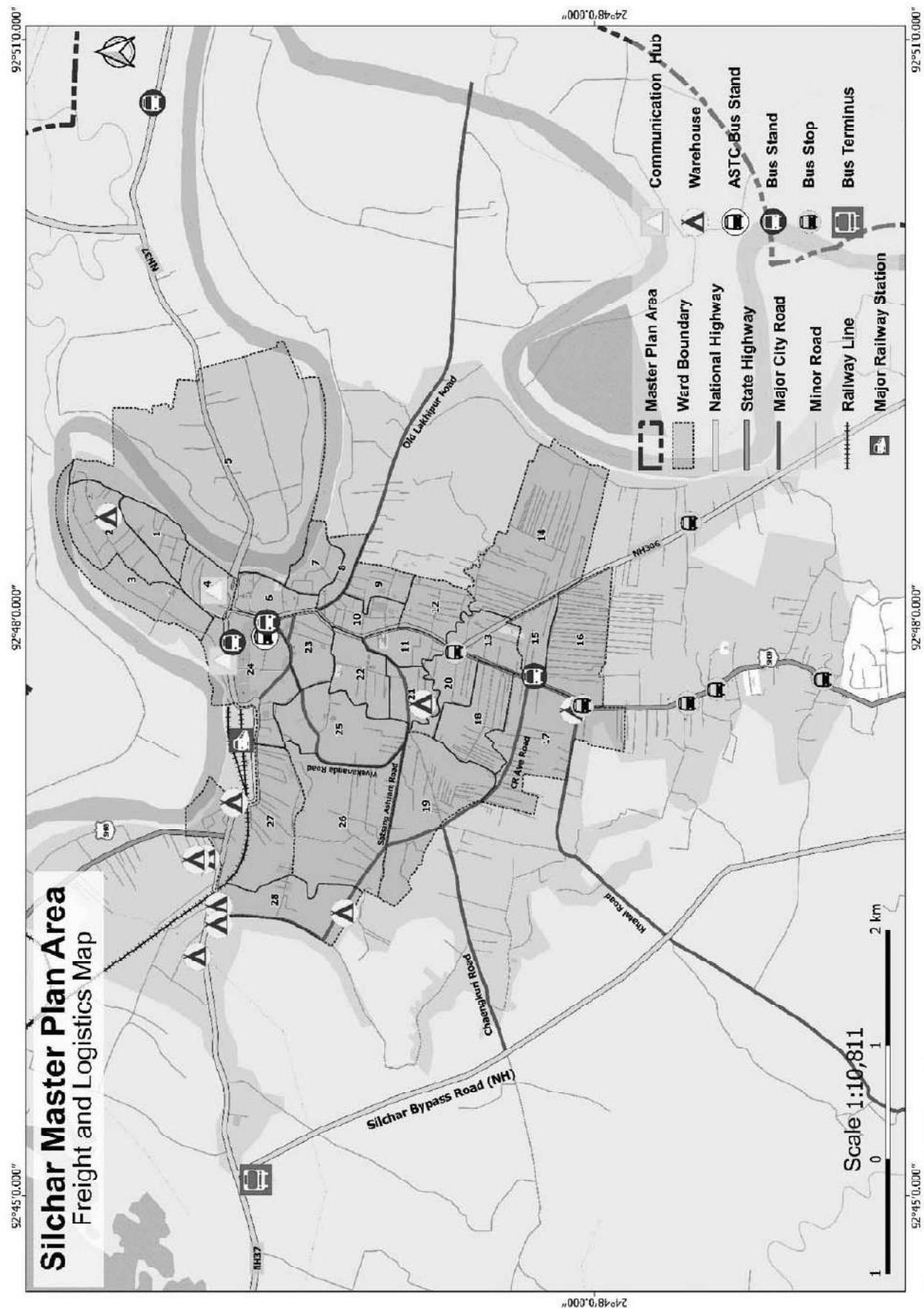
Figure 94 Freight and Logistic location Map

6.4 TRAFFIC SURVEY METHODOLOGY AND ANALYSIS

A comprehensive methodology has been evolved to carry out the work. A stepwise methodology is presented in Figure 95.
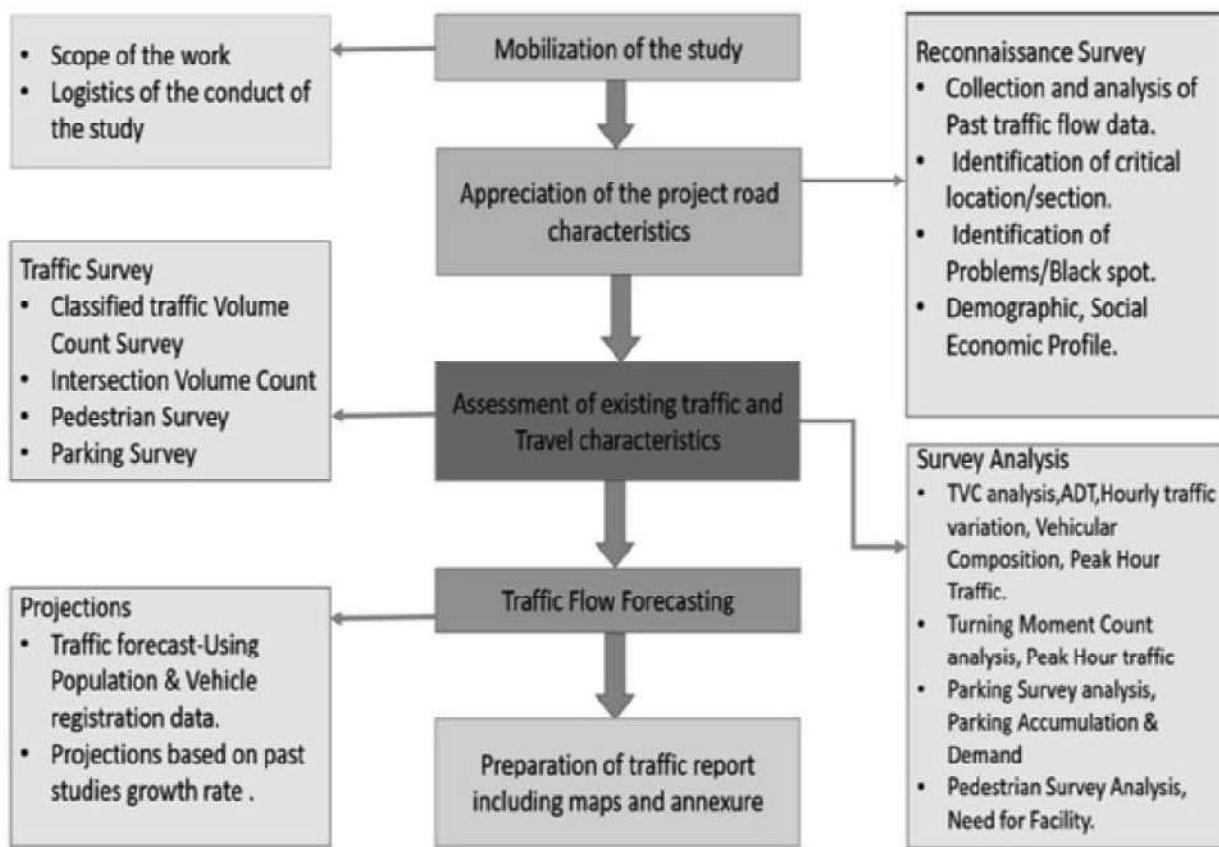
Figure 95 Traffic Survey Methodology

6.4.1 TRAFFIC SURVEY AND SCHEDULE

Classified Traffic Volume Counts (CVC's) have been conducted using manual count by trained enumerators method at different locations. The survey locations are depicted in Figure 96 Traffic survey stations have been selected by the Consultant based on understanding of the road network as well as consideration of the following aspects:

- To represent critical traffic section

- To be a major influence area

- To be located at a level with good visibility

Based on the detailed reconnaissance of the project area, major traffic generators, major intersections and travel patterns, Classified Volume Count (CVC) locations and other surveys were identified at different locations. 3-Day Classified Volume Count (CVC's) and 2- day Origin and Destination (O-D) Survey at a total of 6 locations in Silchar Planning Area to understand traffic intensity in the Master Plan Area. Brief description and analysis of each of the above surveys are presented in the following sections. The schedule of all traffic surveys is presented in Table 104

Table 104 Traffic Survey Locations and Schedule

Sr. No.	Type of Survey	Location	Date
1	**Classified Traffic Volume Count**	Club Road (NH-306)	22-23-24/12/20
		Sadarghat Road (NH-37)	22-23-24/12/20
		Central Road (NH-306)	22-23-24/12/20
		Park Road	22 23 24/12/20
		Fatak Bazar Road	22-23-24/12/20
		Hailakandi Road	22-23-24/12/20
		Ambicapatty Road	22-23-24/12/20
		Meherpur Road	22-23-24/12/20
		Mizoram Road	22-23-24/12/20
2	**Origin-Destination Survey**	Central Point Junction	22-23-24/12/20
		Park Road	22-23-24/12/20
		Janiganj Junction	22-23-24/12/20
		Nahata Point	22-23-24/12/20
		Ambikapatty Junction	22-23-24/12/20
		Rangirkhari Junction	22-23-24/12/20
3	**Turning Movement Count (Junction Analysis)**	Central Point Junction	22-23-24/12/20
		Park Road	22-23-24/12/20
		Janiganj Junction	22-23-24/12/20
		Nahata Point	22-23-24/12/20
		Ambikapatty Junction	22-23-24/12/20
		Rangirkhari Junction	22-23-24/12/20
4	**Parking Survey**	Ambikapatty	13/03/21,15/03/21
		Bhowal Point (central road)	13/03/21,15/03/21
		Collage Road	13/03/21,15/03/21
		Nazirpatty	13/03/21,15/03/21
		Meherpur Road	13/03/21,15/03/21
		Rangirkhari	13/03/21,15/03/21
5	**Pedestrian Survey**	Ambikapatty	13/03/21,15/03/21
		Central Road	13/03/21,15/03/21
		Collage Road	13/03/21,15/03/21
		Nazirpatty	13/03/21,15/03/21
		Meherpur Road	13/03/21,15/03/21
		Rangirkhari	13/03/21,15/03/21
6	**Speed Delay Survey**	Ambikapatty	13/03/21,15/03/21
		Central Road	13/03/21,15/03/21
		Collage Road	13/03/21,15/03/21
		Nazirpatty	13/03/21,15/03/21
		Meherpur Road	13/03/21,15/03/21
		Rangirkhari	13/03/21,15/03/21

(Source: Compiled by Consultants)

Silchar Master Plan Area
Survey Map

Legend:
- National Highway
- State Highway
- Major Roads
- Railway Line
- Parking Survey
- Pedestrian Survey
- O-D Survey
- TMC Survey
- TVC Survey
- Major Railway Station

NH37

Old Lakhipur Road

Park Road

Vivekananda Road

Satsang Ashram Road

SCALE 1:3,518,588:556

500   0   500 m
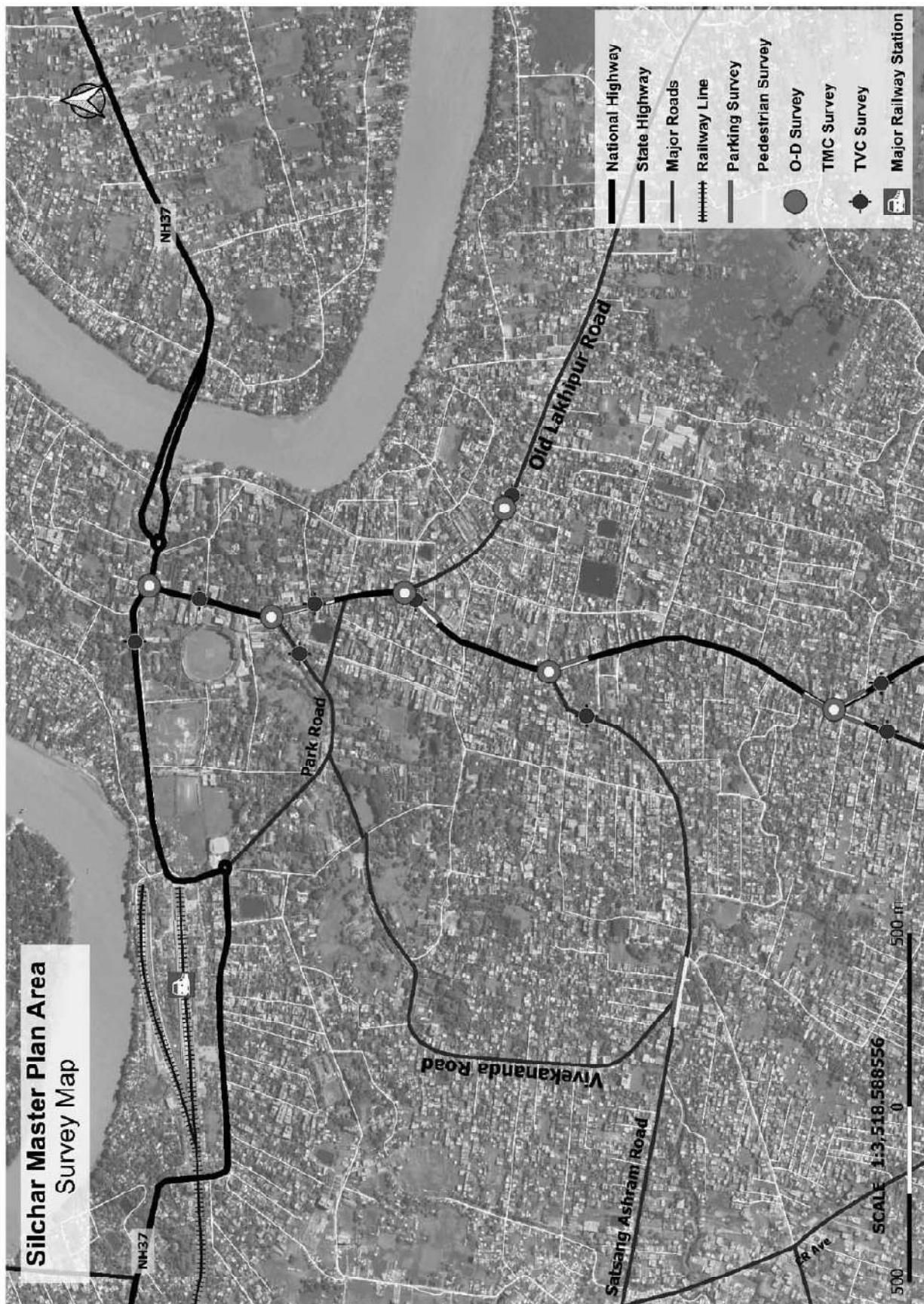
Figure 96 Survey map of SMPA

6.5 TRAFFIC INTENSITY

The various vehicle types having different sizes and characteristics were converted into equivalent passenger car units. The selected survey stretches comprise both urban and rural areas. Hence PCU values were adopted from IRC 64-1990 for rural areas and IRC-106-1990 for urban areas. The PCU values used are presented in Table 105.

Table 105 Vehicle classification system and PCU factors adopted for study

Sr. No.	Vehicle type	PCU factor for Urban	PCU factor for Rural
1	Car/Jeep/Van	1	1
2	Taxi	1	1
3	2-wheeler	0.75	0.5
4	3-wheeler	1.2	1
5	Minibus	1.4	1.5
6	Standard Bus	2.2	3
7	3-wheeler (Goods)	1.2	1
8	LCV	1.4	1.5
9	2 Axle	2.2	3
10	2 Axle	2.2	3
11	MAV	4	4.5
12	Tractor	1.4	1.5
13	Tractor with Trailor	4	4.5
14	Cycle	0.5	0.5
15	Other (JCB/HCM)	4	4.5

(Source: IRC 64-1990, IRC 106-1990)

Club road, Lumbding-Silchar road, Central road, Fatak bazar road, Hailaknadi road, Ambicapatty road, Meherpur road, Mizoram road and Park road have been considered as urban roads for traffic analysis. The photographs of survey locations are as shown in Figures below.

Fatak Bazar Road

Park Road
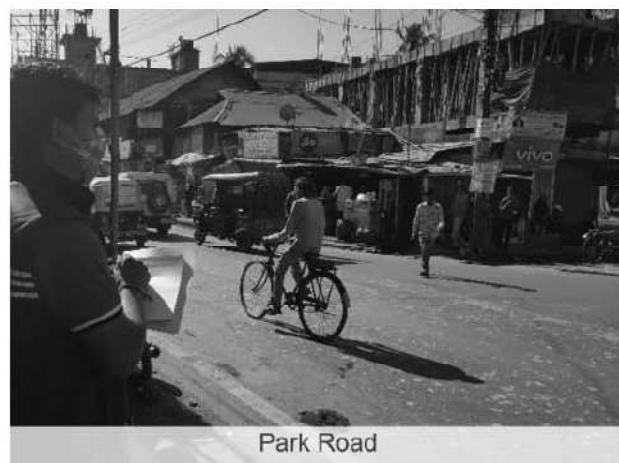
Figure 97 Traffic survey in Silchar

Survey at Ambicapatty

Survey at Hailakandi Road

Survey at Central Road

Survey at Club ROad

Survey at Mizoram Road

Survey at Meherpur Road

Sadarghat Road

Road Mesurement

6.5.1 CLUB ROAD (NH-306)

Annual average daily traffic is 15036 PCU in this road section. Passenger vehicles like car/taxi/utility vehicles, two wheelers predominate the traffic stream. Non-Motorised vehicles were observed in good volume. Some LCV were present while heavy goods vehicles like 2-Axle, 3 Axle, MAV were not much observed. ADT and AADT by vehicle type is presented in Table 106.

Table 106 Average Daily Traffic & Annual Average Daily Traffic on Club road

Vehicle Types	ADT	AADT
Car/Jeep/Van	2130	2243
2-wheeler	4852	4921
3-wheeler	4442	4499
Minibus	22	28
Standard Bus	19	23
3-wheeler (Goods)	0	0
LCV	95	102
2 Axle	611	673
3 Axle	0	0
MAV	0	0
Tractor	0	0
Tractor with Trailor	123	143
Cycle rikshaw	533	587
Cycle	1396	1427
Other (hand cart)	0	0
Total (Nos)	14223	14646
Total (PCU)	14479	15036

(Source: Compiled by Consultants)

6.5.1.1 Directional Split

The traffic data was analyzed to establish the directional distribution of traffic. The directional distribution of traffic at the TVC location is given in Table 107.

Table 107 Directional Distribution of Traffic on Club Road

TVC Location	Directional distribution in vehicle numbers	Directional distribution in PCU
	Capital point to Park road point: Park road point to Capital point	Capital point to Park road point: Park road point to Capital point
Club Road (NH-306)	53:47	54:46

(Source: Compiled by Consultants)

6.5.1.2 Vehicle Composition

Composition of traffic at the midblock location is presented in Figure 99. Road section is occupied by mainly two-wheeler and auto-rikshaws vehicles which are 34% and 31% of total traffic. Thus, commuters are using their personal vehicles to a large extent for daily routine. Public transport (bus) was observed to be less at 0.2% of traffic stream. Goods LVC and 2 axle vehicles comprised 5% of traffic.
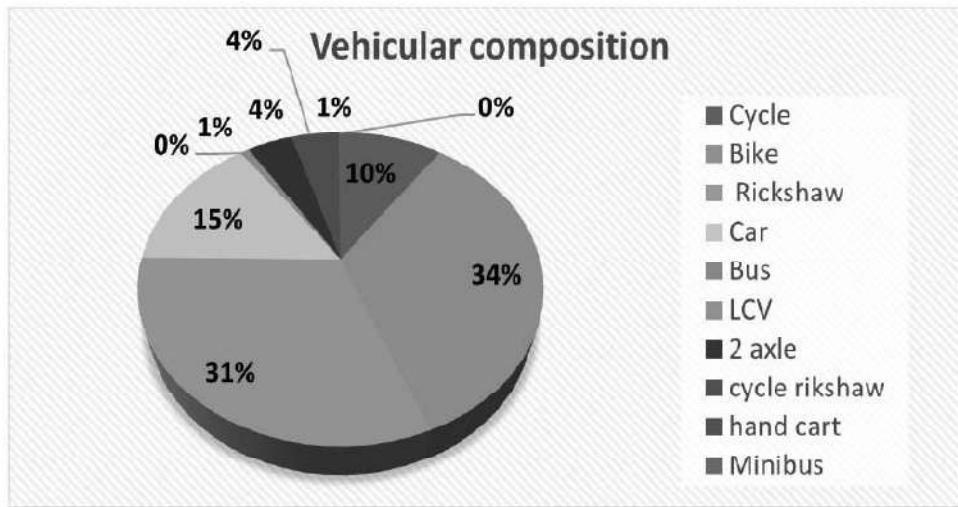
Figure 98 Composition of Traffic on Club Road   (Source: Compiled by Consultants)

### 6.5.1.3 Hourly Variation of Traffic
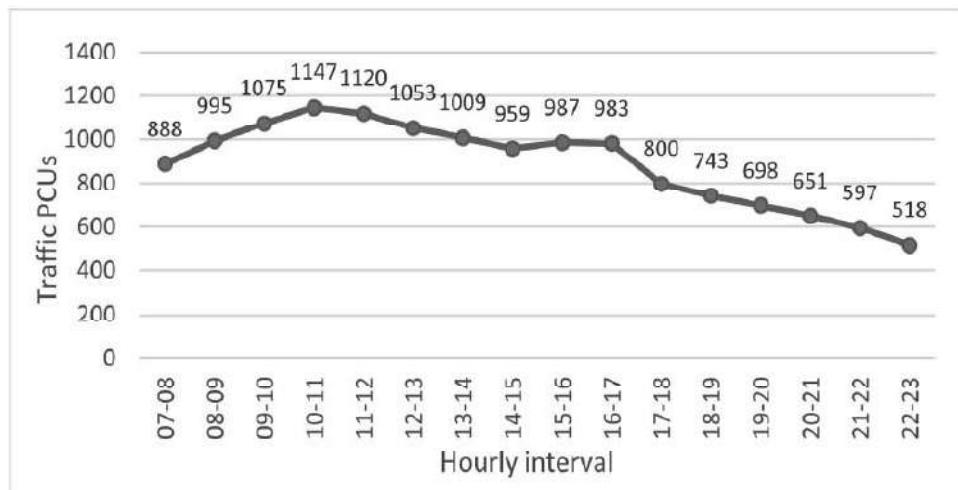
Figure 99 Hourly Variation of traffic at Club road   (Source: Compiled by Consultants)

6.5.1.4 Peak Hour Traffic

Peak hour was found to be from 10:00 to 11:00 HRS. Total peak hour traffic is 1147 in PCU which is 8.0% of ADT. The peak hour and peak hour traffic at the midblock location is presented in Table 108.

Table 108 Peak hour traffic on Club road

PCU/hr	Peak Hours	Peak Hour Factor
1147	10:00 to 11:00	8.0

6.5.2 SADARGHAT ROAD (NH 37)

Annual average daily traffic is 13353 PCU in this road section. Passenger vehicles like car/taxi/utility vehicles, two wheelers predominate the traffic stream. Non-Motorised vehicles were observed in good volume. Some LCV were present while heavy goods vehicles like 2-Axle, 3 Axle, MAV were not much observed. ADT and AADT by vehicle type are presented in Table 109.

Table 109 Average Daily Traffic & Annual Average Daily Traffic on Sadarghat road

Vehicle Types	ADT	AADT
Car/Jeep/Van	2256	2345
2-wheeler	4555	4621
3-wheeler	3817	3964
Minibus	21	25
Standard Bus	21	30
3-wheeler (Goods)	0	0
LCV	58	64
2 Axle	463	481
3 Axle	0	0
MAV	0	0
Tractor	0	0
Tractor with Trailor	0	0
Cycle rikshaw	358	384
Cycle	1402	1437
Other (hand cart)	102	119
Total (Nos)	13053	13470
Total (PCU)	12865	13353

(Source: Compiled by Consultant)

6.5.2.1 Directional Split

The traffic data was analyzed to establish the directional distribution of traffic. The directional distribution of traffic at the TVC location is given in Table 110.

Table 110 Directional Distribution of Traffic on Sadarghat road (NH 37)

TVC Location	Directional distribution in vehicle numbers	Directional distribution in PCU
	Sadarghat point to Railway station: Railway station to Sadarghat point	Sadarghat point to Railway station: Railway station to Sadarghat point
Sadarghat Road (NH 37)	48:52	47:53

(Source: Compiled by Consultant)

6.5.2.2 Vehicle Composition

Composition of traffic at the midblock location is presented in Figure 101. Road section is occupied by mainly two-wheeler and auto-rikshaw vehicles which are 35% and 29% of total traffic. Thus, commuters are using their personal vehicles to a large extent for daily routine. Public transport (bus) was observed to be less at 0.1% of traffic stream. LCV and 2 axle vehicles comprised 5% of traffic.
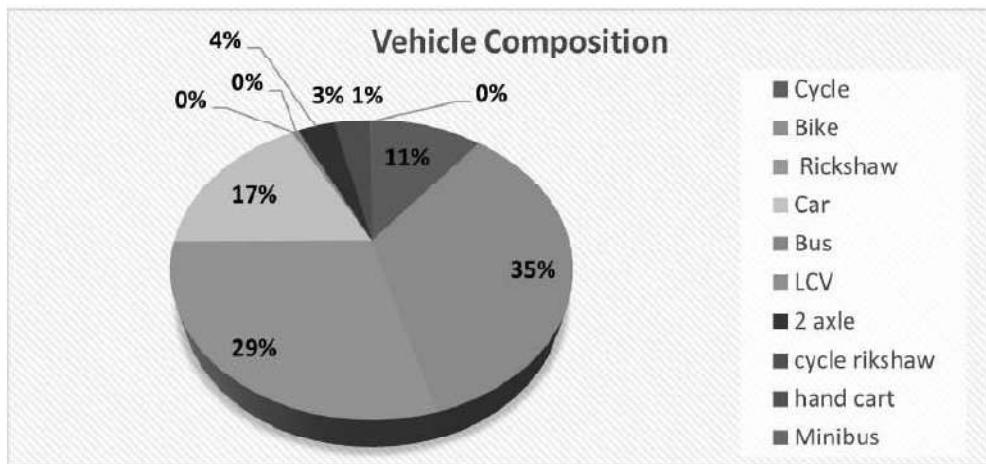
Figure 100 Composition of Traffic on Sadarghat Road

(Source: Compiled by Consultant)

6.5.2.3 Hourly Variation of Traffic

The hourly distribution of traffic to understand hourly variation and peak hour traffic characteristics at Sadarghat road Main Road as shown in Figure 101.
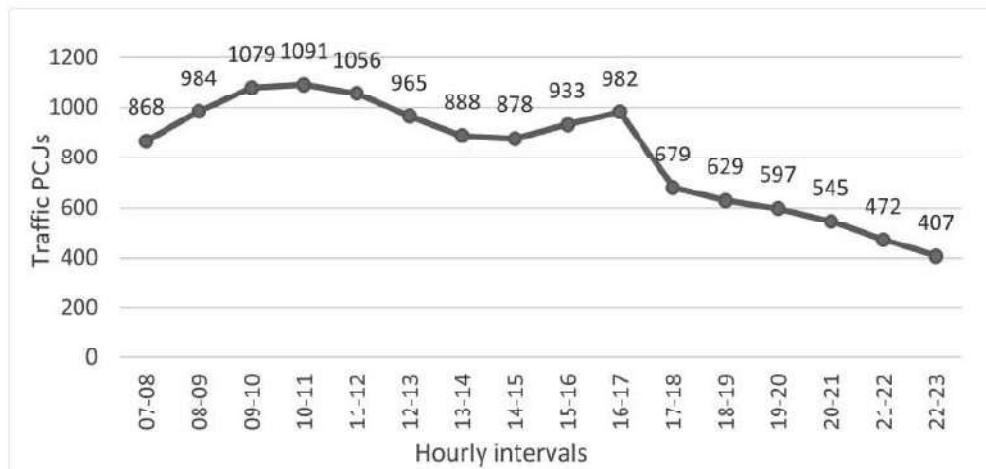

Figure 101 Hourly Variation of traffic at Sadarghat road

(Source: Compiled by Consultant)

6.5.2.4 Peak Hour Traffic

Peak hour was found to be from 10:00 to 11:00 HRS. Total peak hour traffic is 1091 in PCU which is 8.3% of ADT. The peak hour and peak hour traffic at the midblock location is presented in Table 111.

Table 111 Peak hour traffic on Sadarghat road

PCU/hr	Peak Hours	Peak Hour Factor
1091	10:00 to 11:00	8.3

(Source. Compiled by Consultant)

6.5.3 CENTRAL ROAD

Annual average daily traffic is 20816 PCU in this road section. Passenger vehicles like car/taxi/utility vehicles, two wheelers predominate the traffic stream. Non-Motorized vehicles were observed in good volume. Two-wheelers and Three-wheelers were dominant in total traffic. Very few LCVs were present while heavy goods vehicles like 2-Axle, 3 Axle, MAV were not much observed. ADT and AADT by vehicle type is presented in Table 112.

Table 112 Average Daily Traffic & Annual Average Daily Traffic on Central road

Vehicle Types	ADT	AADT
Car/Jeep/Van	2939	3154
2-wheeler	7726	7924
3-wheeler	5952	6163
Minibus	16	20
Standard Bus	8	8
3-wheeler (Goods)	0	0
LCV	58	63
2 Axle	248	276
3 Axle	0	0
MAV	0	0
Tractor	0	0
Tractor with Trailor	0	0
Cycle rikshaw	687	693
Cycle	4156	4223
Other (hand cart)	209	213
Total (Nos)	21997	22737
Total (PCU)	20068	20816

(Source: Compiled by Consultant)

6.5.3.1 Directional Split

The traffic data was analyzed to establish the directional distribution of traffic. The directional distribution of traffic at the TVC location is given in Table 113.

Table 113 Directional Distribution of Traffic on Central Road

TVC Location	Directional distribution in vehicle numbers	Directional distribution in PUC
	Central road to Hospital road: Hospital road to park road	central road to Hospital road: hospital road to park road
Central Road	51:49	50:50

(Source: Compiled by Consultant)

6.5.3.2 Vehicle Composition

Composition of traffic at the midblock location is presented in Figure 103. Road section is occupied by mainly two-wheeler, auto-rikshaws and cycle and which are 35%,27% and 19% of total traffic. Thus, commuters are using their personal vehicles to a large extent for daily routine. Public transport (bus) was observed to be less at 0.1% of traffic stream. LCV and 2 axle vehicles comprised 2% of traffic.
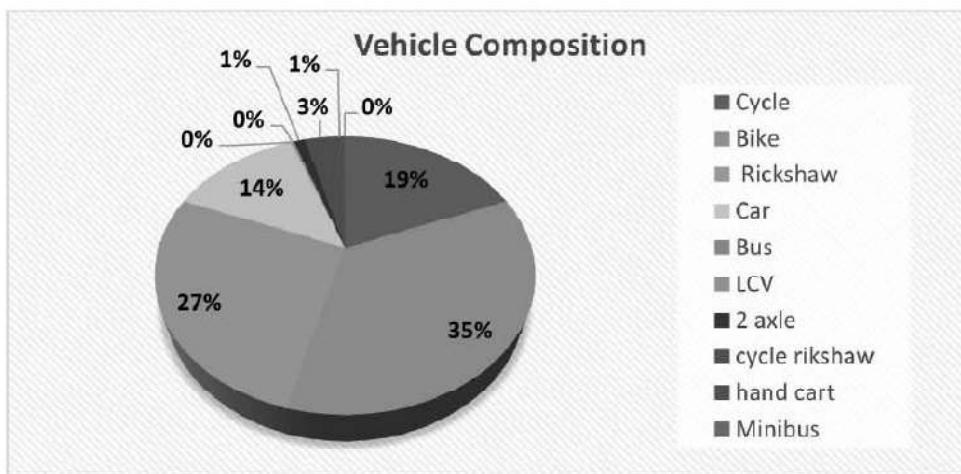
Figure 102 Composition of Traffic on Central Road

(Source: Compiled by Consultant)

6.5.3.3 Hourly Variation of Traffic

The hourly distribution of traffic to understand hourly variation and peak hour traffic characteristics at Central Road as shown in Figure 103.
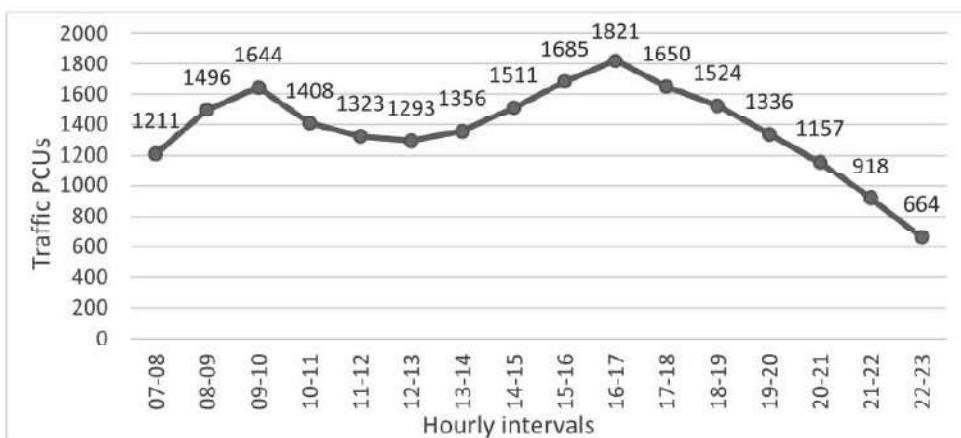

Figure 103 Hourly Variation of traffic at Central road

(Source: Compiled by Consultant)

6.5.3.4 Peak Hour Traffic

Peak hour was found to be from 16:00 to 17:00 HRS. Total peak hour traffic is 1821 in PCU which is 8.2 % of ADT. The peak hour and peak hour traffic at the midblock location is presented in Table 114.

Table 114 Peak hour traffic on Central Road

PCU/hr	Peak Hours	Peak Hour Factor
1821	16:00 to 17:00	8.2 %

(Source: Compiled by Consultant)

6.5.4 PARK ROAD

Annual average daily traffic is 18393 PCU in this road section. Passenger vehicles like car/taxi/utility vehicles, two wheelers predominate the traffic stream. Non-Motorised vehicles were observed in good volume. Auto 3-wheelers and two- wheelers were dominant in high number while heavy goods vehicles like 3 Axle, MAV were not much observed. ADT and AADT by vehicle type is presented in Table 115.

Table 115 Average Daily Traffic & Annual Average Daily Traffic on Park road

Vehicle Types	ADT	AADT
Car/Jeep/Van	1890	1923
2-wheeler	6536	6932
3-wheeler	5954	6128
Minibus	20	24
Standard Bus	12	18
3-wheeler (Goods)	0	0
LCV	42	51
2 Axle	374	384
3 Axle	0	0
MAV	0	0
Tractor	0	0
Tractor with Trailor	0	0
Cycle rikshaw	886	893
Cycle	2719	2854
Other (hand cart)	133	143
Total (Nos)	18566	19350
Total (PCU)	17695	18393

(Source: Compiled by Consultant)

6.5.4.1 Directional Split

The traffic data was analyzed to establish the directional distribution of traffic. The directional distribution of traffic at the TVC location is given in Table 116.

Table 116 Directional Distribution of Traffic on Park Road

TVC Location	Directional distribution in vehicle numbers	Directional distribution in PCU
	Gandhi Park to Central Road: Central Road to Gandhi Park	Gandhi Park to Central Road: Central Road to Gandhi Park
Park Road	54:46	54:46

(Source: Compiled by Consultant)

6.5.4.2 Vehicle Composition

Composition of traffic at the midblock location is presented in Figure 104. Road section is occupied by mainly two-wheeler and rikshaws vehicles which are 36% and 32% of total traffic. Thus, commuters are using their personal vehicles to a large extent for daily routine. Public transport (bus) was observed to be less at 0.1% of traffic stream. LVC and 2 axle vehicles comprised 3% of traffic.
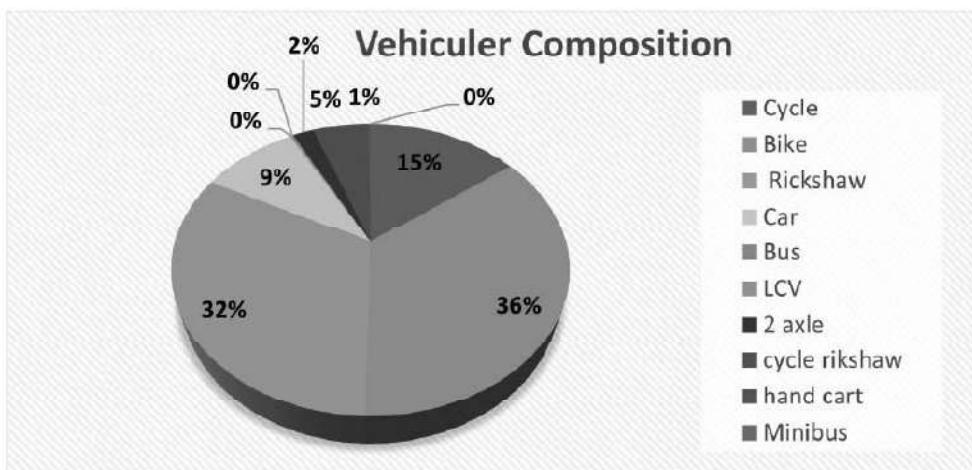
Figure 104 Composition of Traffic on Park Road

6.5.4.3 Hourly Variation of Traffic

The hourly distribution of traffic to understand hourly variation and peak hour traffic characteristics at Park Road as shown in Figure 105.
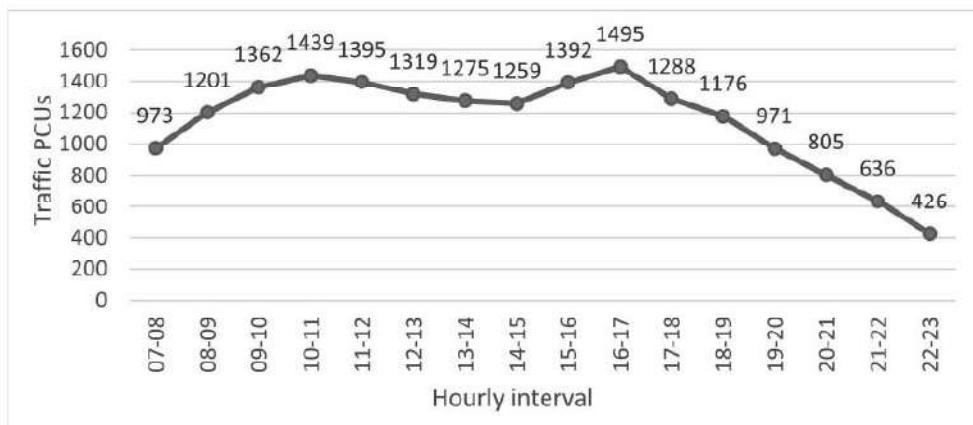

Figure 105 Hourly Variation of traffic at Park road

6.5.4.4 Peak Hour Traffic

Peak hour was found to be from 16:00 to 17:00 HRS. Total peak hour traffic is 1495 in PCU which is 8.0% of ADT. The peak hour and peak hour traffic at the midblock location is presented in Table 117.

Table 117 Peak hour traffic on Park Road

PCU/hr	Peak Hours	Peak Hour Factor
1495	10:00 to 11:00	8.0%

6.5.5 FATAK BAZAR ROAD

Annual average daily traffic is 20644 PCU in this road section. Passenger vehicles like car/taxi/utility vehicles, two wheelers predominate the traffic stream. Non-Motorized vehicles were observed in less volume. 2-wheeler and 3-wheeler were dominating mix traffic. Goods 3-wheeled vehicles were absent. LCVs were present in good numbers while heavy goods vehicles like 3 Axle, MAV were not observed. ADT and AADT by vehicle type is presented in Table 118.

Table 118 Average Daily Traffic & Annual Average Daily Traffic on Fatak Bazar road

Vehicle Types	ADT	AADT
Car/Jeep/Van	2232	2354
2-wheeler	6469	6523
3-wheeler	5492	5732
Minibus	17	21
Standard Bus	11	18
3-wheeler (Goods)	0	0
LCV	111	128
2 Axle	1405	1523
3 Axle	0	0
MAV	0	0
Tractor	0	0
Tractor with Trailor	0	0
Cycle rikshaw	496	521
Cycle	1622	1698
Other (hand cart)	431	482
Total (Nos)	18286	19000
Total (PCU)	19668	20644

6.5.5.1 Directional Split

The traffic data was analyzed to establish the directional distribution of traffic. The directional distribution of traffic at the TVC location is given in Table 119.

Table 119 Directional Distribution of Traffic on Fatak bazar Road

TVC Location	Directional distribution in vehicle numbers	Directional distribution in PCU
	Janigunj Point to Nahata point: Nahata point to Janigunj Point	Janigunj Point to Nahata point: Nahata point to Janigunj Point
Fatak bazar Road	53:47	54:46

6.5.5.2 Vehicle Composition

Composition of traffic at the midblock location is presented in Figure 106. Road section is occupied by mainly two-wheeler and Rikshaws vehicles which are 35% and 30% of total traffic. Thus, commuters are using their personal vehicles to a large extent for daily routine. Public transport (bus) was observed to be less at 0.1% of traffic stream. LCV and 2 axle vehicles comprised 9% of traffic.
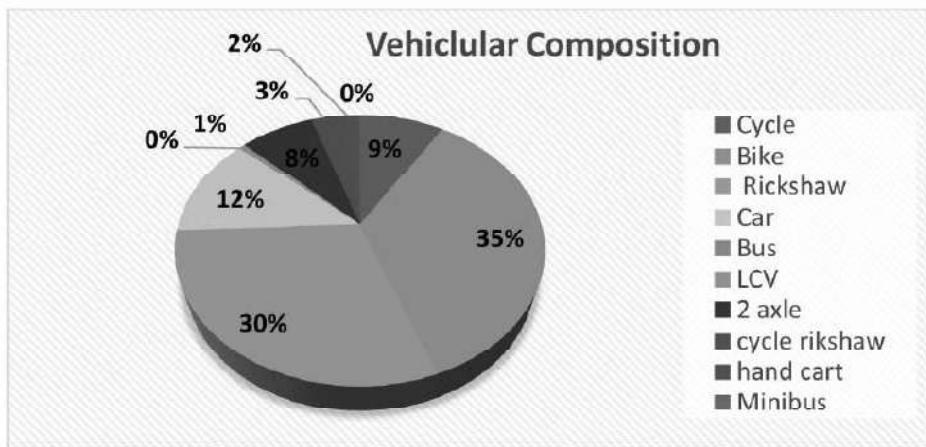
Figure 106 Composition of Traffic on Fatak Bazar Road   (Source: Compiled by Consultant)

6.5.5.3 Hourly Variation of Traffic

The hourly distribution of traffic to understand hourly variation and peak hour traffic characteristics at Fatak Bazar Main Road as shown in Figure 107.
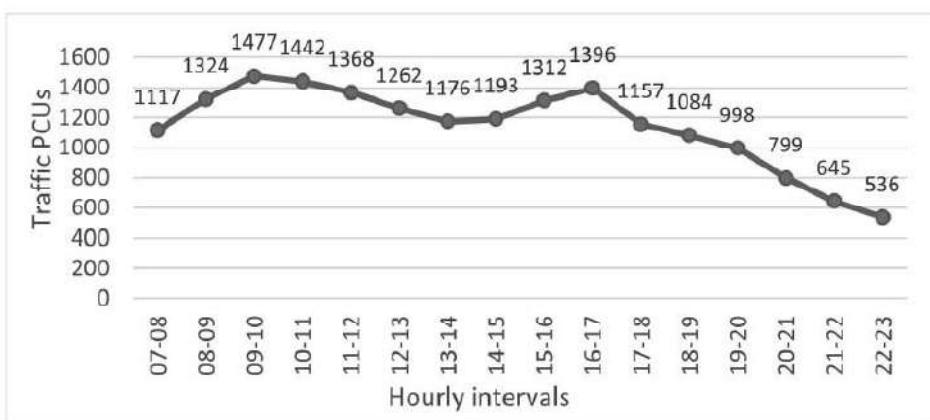

Figure 107 Hourly Variation of traffic at Fatak Bazar road   (Source: Compiled by Consultant)

6.5.5.4 Peak Hour Traffic

Peak hour was found to be from 09:00 to 10:00 HRS. Total peak hour traffic is 1477 in PCU which is 8.0% of ADT. The peak hour and peak hour traffic at the midblock location is presented in Table 120.

Table 120 Peak hour traffic on Fatak bazar Road

PCU/hr	Peak Hours	Peak Hour Factor
1477	09:00 to 10:00	8.0

(Source: Compiled by Consultant)

6.5.6 HAILAKANDI ROAD (NH-306)

Annual average daily traffic is 13271 PCU in this road section. Passenger vehicles like car/taxi/utility vehicles, two wheelers predominate the traffic stream. Non-Motorised vehicles were observed in high volume. LCV vehicles were present in few number while heavy goods vehicles like 3 Axle, MAV were not much observed. 2-Axle were present in good numbers. ADT and AADT by vehicle type is presented in Table 121.

Table 121 Average Daily Traffic & Annual Average Daily Traffic on Hailakandi road

Vehicle Types	ADT	AADT
Car/Jeep/Van	1014	1134
2-wheeler	2956	3176
3-wheeler	1152	1253
Minibus	0	0
Standard Bus	0	0
3-wheeler (Goods)	0	0
LCV	39	45
2 Axle	726	794
3 Axle	0	0
MAV	0	0
Tractor	0	0
Tractor with Trailor	0	0
Cycle rikshaw	2752	2643
Cycle	3017	3089
Other (hand cart)	549	575
Total (Nos)	12205	12709
Total (PCU)	12723	13271

(Source: Compiled by Consultant)

6.5.6.1 Directional Split

The traffic data was analyzed to establish the directional distribution of traffic. The directional distribution of traffic at the TVC location is given in Table 122.

Table 122 Directional Distribution of Traffic on Hailakandi Road

TVC Location	Directional distribution in vehicle numbers	Directional distribution in PCU
	Hailakandi Road to Baroda colony: Baroda colony to Hailakandi road	Hailakandi Road to Baroda colony: Baroda colony to Hailakandi road
Hailakandi Road	48:52	49:51

(Source: Compiled by Consultant)

6.5.6.2 Vehicle Composition

Composition of traffic at the midblock location is presented in Figure 108. Road section is occupied by mainly two-wheeler i.e., bike and cycle vehicles which are 24% and 25% of total traffic. Thus, commuters are using their personal vehicles to a large extent for daily routine. LCV and 2 axel vehicles comprised 7% of traffic.

Vehicle Composition
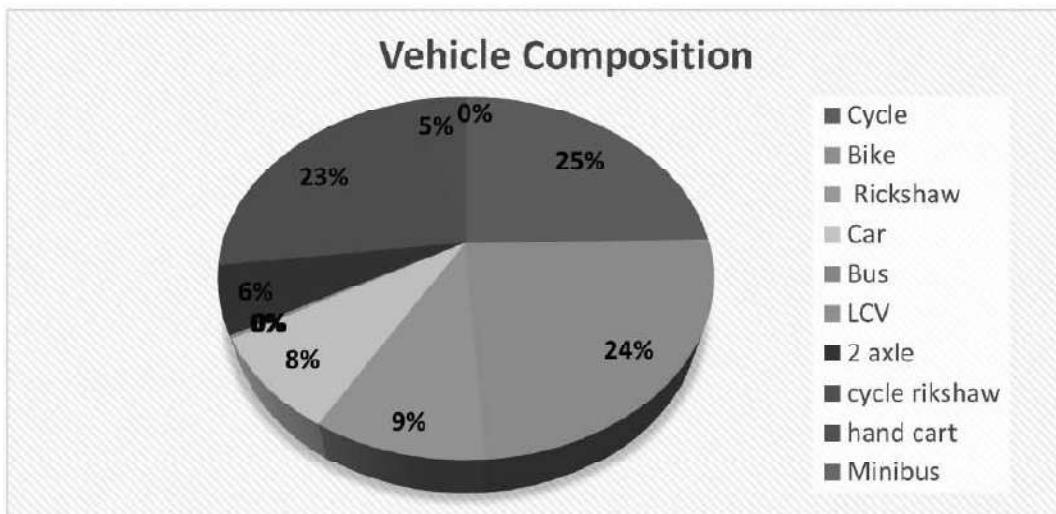
Figure 108 Composition of Traffic on Hailakandi Road   (Source: Compiled by Consultant)

6.5.6.3 Hourly Variation of Traffic

The hourly distribution of traffic to understand hourly variation and peak hour traffic characteristics at Hailakndi Road as shown in Figure 109.
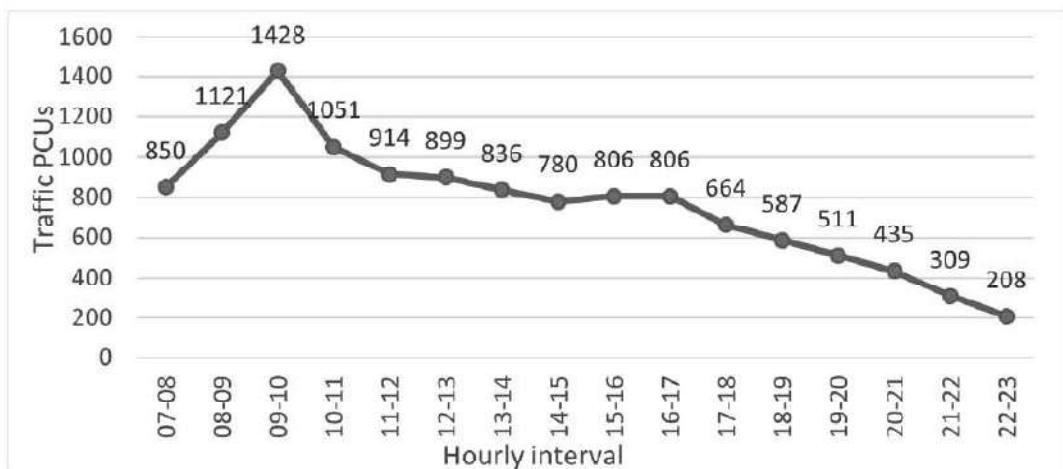
Figure 109 Hourly Variation of traffic at Hailakandi road

(Source: Compiled by Consultant)

6.5.6.4 Peak Hour Traffic

Peak hour was found to be from 9:00 to 10:00 HRS. Total peak hour traffic is 1428 in PCU which is 11.75% of ADT. The peak hour and peak hour traffic at the midblock location is presented in Table 123.

Table 123 Peak hour traffic on Hailakandi Road

PCU/hr	Peak Hours	Peak Hour Factor
1428	09:00 to 10:00	11.75

(Source: Compiled by Consultant)

6.5.7 AMBICAPATTY ROAD

Annual average daily traffic is 27302 PCU in this road section. Passenger vehicles like three-wheeler vehicles and two wheelers predominate the traffic stream. Non-Motorised vehicles were observed in good volume. LCV vehicles were present in small number while heavy goods vehicles like 3 Axle, MAV were observed here due to outer road links with other districts. ADT and AADT by vehicle type is presented in Table 124.

Table 124 Average Daily Traffic & Annual Average Daily Traffic on Ambicapatty road

Vehicle Types	ADT	AADT
Car/Jeep/Van	5283	5437
2-wheeler	8587	8642
3-wheeler	5938	6239
Minibus	279	281
Standard Bus	50	62
3-wheeler (Goods)	0	0
LCV	108	114
2 Axle	787	803
3 Axle	0	0
MAV	0	0
Tractor	0	0
Tractor with Trailor	0	0
Cycle rikshaw	2139	2214
Cycle	3079	3143
Other (hand cart)	391	404
Total (Nos)	26641	27339
Total (PCU)	26511	27302

(Source: Compiled by Consultant)

6.5.7.1 Directional Split

The traffic data was analyzed to establish the directional distribution of traffic. The directional distribution of traffic at the TVC location is given in Table 125.

Table 125 Directional Distribution of Traffic on Ambica patty Road

TVC Location	Directional distribution in vehicle numbers	Directional distribution in PCU
	Ambicapatty Point to Collage Road: Collage road to Ambicapatty Point	Ambicapatty Point to Collage Road: Collage road to Ambicapatty Point
Ambicapatty Road	47:53	47:53

(Source: Compiled by Consultant)

6.5.7.2 Vehicle Composition

Composition of traffic at the midblock location is presented in Figure 110. Road section is occupied by mainly two-wheeler i.e., bike and Rikshaws vehicles which are 32% and 22% of total traffic. 4 wheelers have 20% of share. Thus, commuters are using their personal vehicles to a large extent for daily routine. LCV and 2 axel vehicles comprised 4% of traffic.
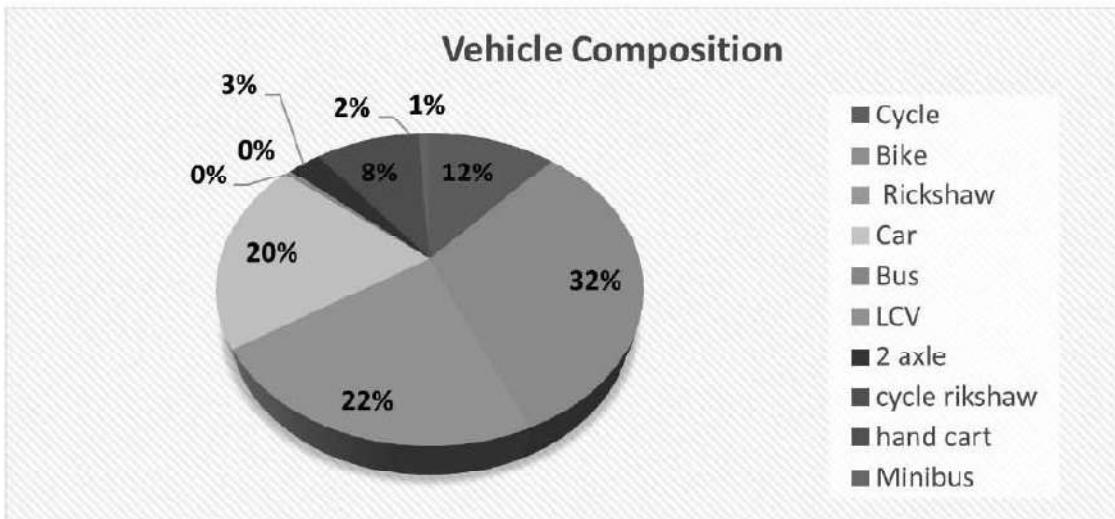
Figure 110 Composition of Traffic on Ambicapatty Road   (Source: Compiled by Consultant)

6.5.7.3 Hourly Variation of Traffic

The hourly distribution of traffic to understand hourly variation and peak hour traffic characteristics at Ambicapatty Road as shown in Figure 111.
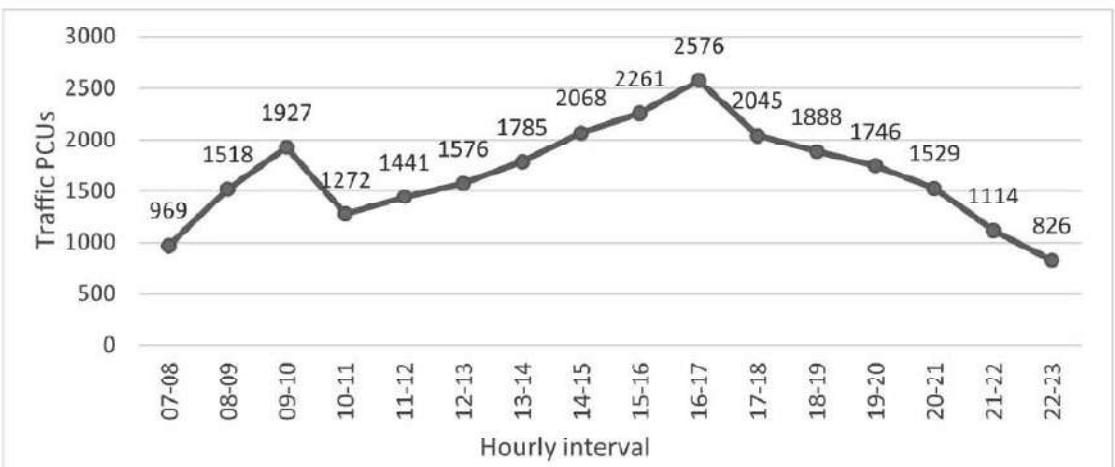

Figure 111 Hourly Variation of traffic at Ambicapatty road   (Source: Compiled by Consultant)

6.5.7.4 Peak Hour Traffic

Peak hour was found to be from 16:00 to 17:00 HRS. Total peak hour traffic is 2576 in PCU which is 9.6% of ADT. The peak hour and peak hour traffic at the midblock location is presented in Table 126.

Table 126 Peak hour traffic on Ambicapatty Road

PCU/hr	Peak Hours	Peak Hour Factor
2576	16:00 to 17:00	9.6

(Source: Compiled by Consultant)

6.5.8 MEHERPUR ROAD

Annual average daily traffic is 13271 PCU in this road section. Passenger vehicles like three-wheeler vehicles and two wheelers predominate the traffic stream. Non-Motorised vehicles were observed in good volume. LCV vehicles were present in small number while heavy goods vehicles like 3 Axle, MAV were not observed. 2-Axle were observed in high numbers. ADT and AADT by vehicle type is presented in Table 127.

Table 127 Average Daily Traffic & Annual Average Daily Traffic on Meherpur road

Vehicle Types	ADT	AADT
Car/Jeep/Van	6775	6923
2-wheeler	10565	11634
3-wheeler	8639	8723
Minibus	18	22
Standard Bus	126	143
3-wheeler (Goods)	0	0
LCV	150	173
2 Axle	1516	1623
3 Axle	0	0
MAV	0	0
Tractor	0	0
Tractor with Trailor	0	0
Cycle rikshaw	984	1029
Cycle	1936	1993
Other (hand cart)	351	367
Total (Nos)	31060	32630
Total (PCU)	32115	33607

(Source: Compiled by Consultant)

6.5.8.1 Directional Split

The traffic data was analyzed to establish the directional distribution of traffic. The directional distribution of traffic at the TVC location is given in Table 128.

Table 128 Directional Distribution of Traffic on Meherpur Road

TVC Location	Directional distribution in vehicle numbers	Directional distribution in PCU
	Rangirkhari Point to Chittranjan Point: Chittranjan Point to Rangirkhari Point	Rangirkhari Point to Chittranjan Point: Chittranjan Point to Rangirkhari Point
Meherpur Road	52:48	53:47

(Source: Compiled by Consultant)

6.5.8.2 Vehicle Composition

Composition of traffic at the midblock location is presented in Figure 112. Road section is occupied by mainly two-wheeler i.e., bike and rikshaw vehicles which are 34% and 28% of total traffic. 4 wheelers comprise of 22% from the total share. Thus, commuters are using their personal vehicles to a large extent for daily routine. LCV and 2 axel vehicles comprised 6% of traffic.
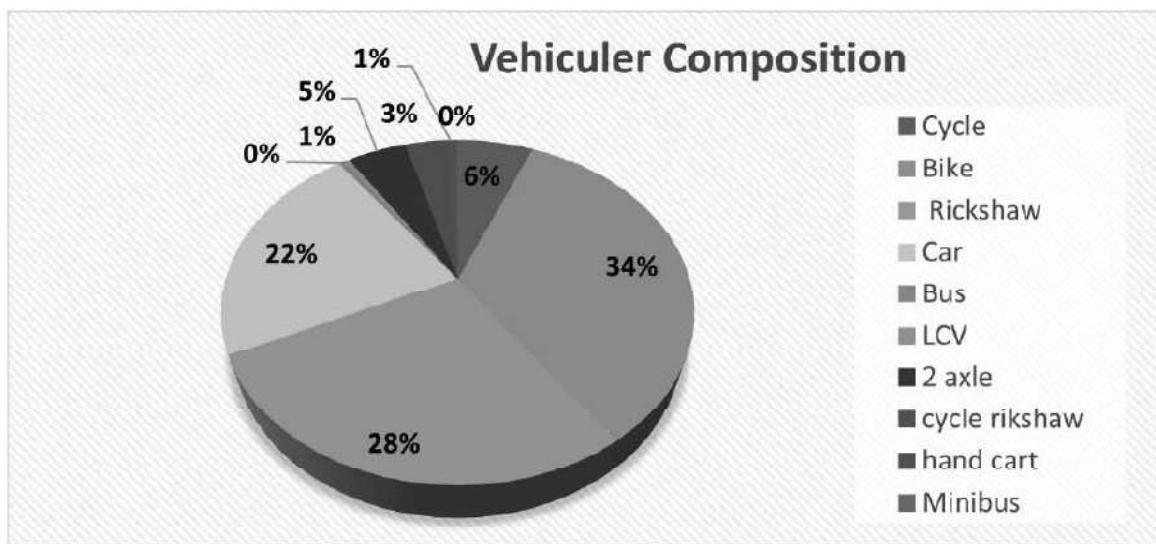
Figure 112 Composition of Traffic on Meherpur Road

(Source: Compiled by Consultant)

6.5.8.3 Hourly Variation of Traffic

The hourly distribution of traffic to understand hourly variation and peak hour traffic characteristics at Meherpur Road as shown in Figure 113.
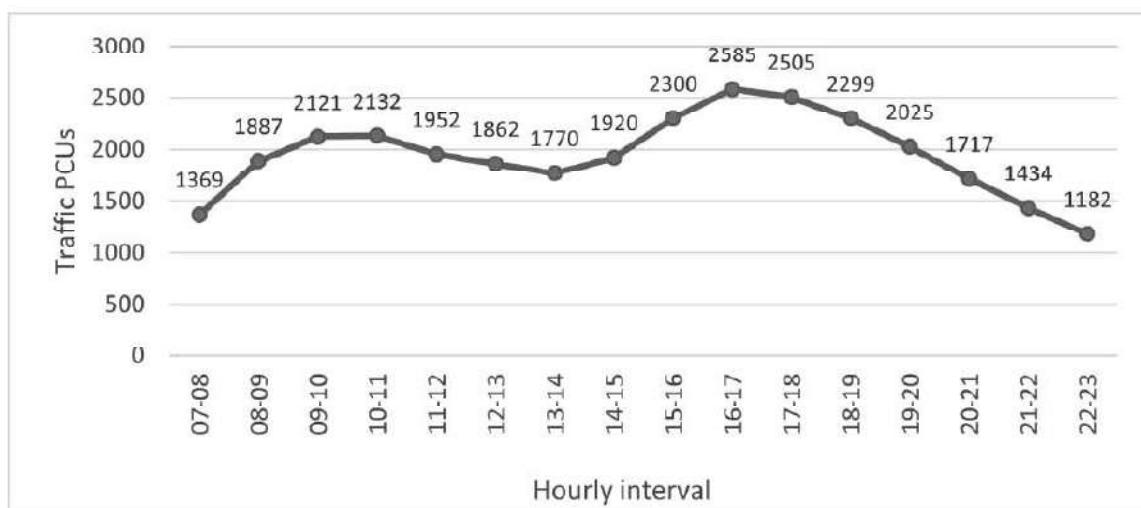

Figure 113 Hourly Variation of traffic at Meherpur road

(Source: Compiled by Consultant)

6.5.8.4 Peak Hour Traffic

Peak hour was found to be from 16:00 to 17:00 HRS. Total peak hour traffic is 2585 in PCU which is 8.3% of ADT. The peak hour and peak hour traffic at the midblock location is presented in Table 129.

Table 129 Peak hour traffic on Meherpur Road

PCU/hr	Peak Hours	Peak Hour Factor
2585	16:00 to 17:00	8.3

(Source: Compiled by Consultant)

6.5.9 MIZORAM ROAD (NH-306)

Annual average daily traffic is 28025 PCU in this road section. Passenger vehicles like three-wheeler vehicles and two wheelers predominate the traffic stream. Non-Motorized vehicles were observed in medium volume. LCV vehicles were present in small number while heavy goods vehicles like Axle, MAV were not observed. ADT and AADT by vehicle type is presented in Table 130.

Table 130 Average Daily Traffic & Annual Average Daily Traffic on Mizoram road

Vehicle Types	ADT	AADT
Car/Jeep/Van	5050	5197
2-wheeler	10953	11457
3-wheeler	8540	8621
Minibus	36	43
Standard Bus	35	51
3-wheeler (Goods)	0	0
LCV	204	259
2 Axle	0	0
3 Axle	0	0
MAV	0	0
Tractor	0	0
Tractor with Trailor	0	0
Cycle rikshaw	712	823
Cycle	2353	2467
Other (hand cart)	355	378
Total (Nos)	28238	29296
Total (PCU)	27022	28025

(Source: Compiled by Consultant)

6.5.9.1 Directional Split

The traffic data was analyzed to establish the directional distribution of traffic. The directional distribution of traffic at the TVC location is given in Table 131.

Table 131 Directional Distribution of Traffic on Mizoram Road

TVC Location	Directional distribution in vehicle numbers	Directional distribution in PCU
	Rangirkhari to Post office: Post office to Rangirkhari	Rangirkhari to Post office: Post office to Rangirkhari
Mizoram Road	51:49	50:50

(Source: Compiled by Consultant)

6.5.9.2 Vehicle Composition

Composition of traffic at the midblock location is presented in Figure 114. Road section is occupied by mainly two-wheeler i.e., bike and cycle vehicles which are 39% and 30% of total traffic. Thus, commuters are using their personal vehicles to a large extent for daily routine. LCV and 2 axel vehicles comprised 1% of traffic.
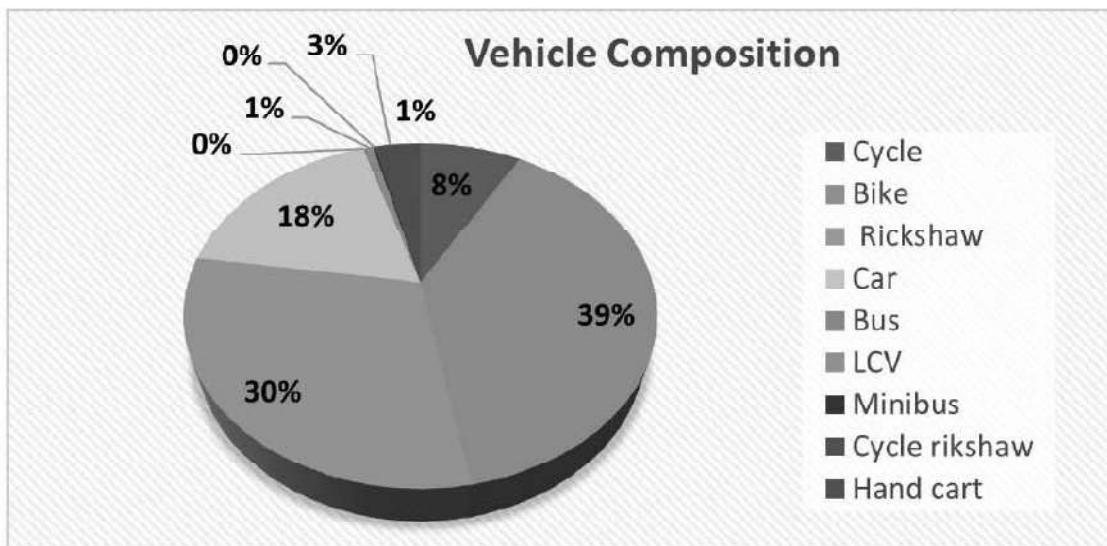
Figure 114 Composition of Traffic on Mizoram Road

(Source: Compiled by Consultant)

6.5.9.3 Hourly Variation of Traffic

The hourly distribution of traffic to understand hourly variation and peak hour traffic characteristics at Mizoram Road as shown in Figure 115.
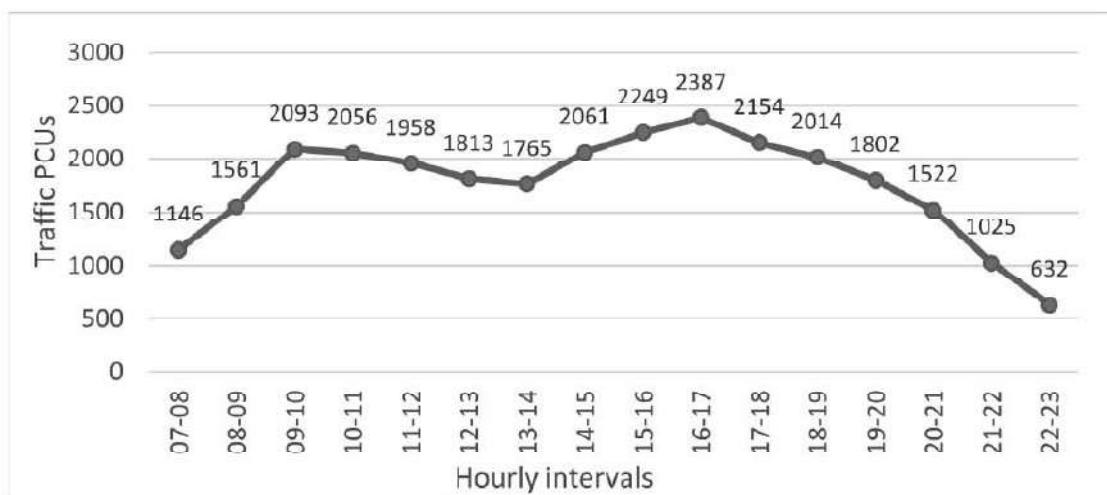

Figure 115 Hourly Variation of traffic at Mizoram road

6.5.9.4 Peak Hour Traffic

Peak hour was found to be from 16:00 to 17:00 HRS. Total peak hour traffic is 2387 in PCU which is 8.4% of ADT. The peak hour and peak hour traffic at the midblock location is presented in Table 132.

Table 132 Peak hour traffic on Mizoram Road

PCU/hr	Peak Hours	Peak Hour Factor
2387	16:00 to 17:00	8.4

(Source: Compiled by Consultant)

6.5.10 TRAFFIC CONGESTION

Traffic congestion takes place when traffic spills over than the design capacity of any road. The severity of traffic congestion can be identified using average daily traffic count und volume by capacity ratio method. Ratio greater than 1 indicates sever congestion, 0.75 to 1 indicates heavy congestion,0.50 to 0.75 indicates moderate congestion and less than 0.5 considered as low congestion.

Table 133 V/C ratio on Major roads

| Sr. No.	Location	ADT	V/C
1	Club road (NH-306)	14223	0.81
2	Sadarghat road (NH 37)	13053	0.74
3	Central Road	21997	1.2
4	Park Road	18566	1
5	Fatak Bazar Road	18286	1
6	Hailakandi Road (NH-306)	12205	0.69
7	Ambica patty Road	26641	1.5
8	Meherpur Road	31060	0.89
9	Mizoram Road (NH-306)	28238	1.6

(Source. Compiled by Consultant)

Form the analysis mentioned in above Table 133 it can be inferred that the patches of Central road, Park road, Fatak Bazar road, Ambica patty, and Mizoram road are congested with severe traffic. Another major road I.e Club road, Sadarghat road and Meherpur road are facing heavy traffic congestion. Moderate congestion observed only at major junctions of Hailakandi road.

6.5.11 OVERVIEW OF CRITICAL ROADS

Road capacity, in general refers to the maximum traffic flow obtainable on a given roadway using all available lanes. Critical roads depend upon several factors, mainly, traffic conditions, road geometry characteristics, environmental factors etc. The critical assessment of road capacities on major urban roads is carried out by field traffic surveys to capture the classified volume count for major roads spread across the city through manual as well as video graphic techniques. Based on the collected data, the existing traffic volume per lane was ascertained during peak hours. This has been compared with the maximum Road capacity values to critically analyse the existing capacity potential of major roads in the city. Based on our study, the critical roads were observed and depicted in figure given below. The critical roads, depicted with red color, include, Central road, Park road, Fatak Bazar road, Ambica patty, and Mizoram road, indicates that there is need to decongest the roads and propose for road widening in order to ensure free flow of traffic movement in SMPA.

Silchar Master Plan Area
Critical Road Map

Ward Boundary
National Highway
State Highway
Major City Road
Minor Road
Railway Line
Heavy Congested
Severly Congested

NH37

Old Lakhipur Road

Park Road

CR Ave Road

Satsang Ashram Road

Vivekanando Road

NH306

NH37

Scale 1:6,200

250　　0　　250　　500 m
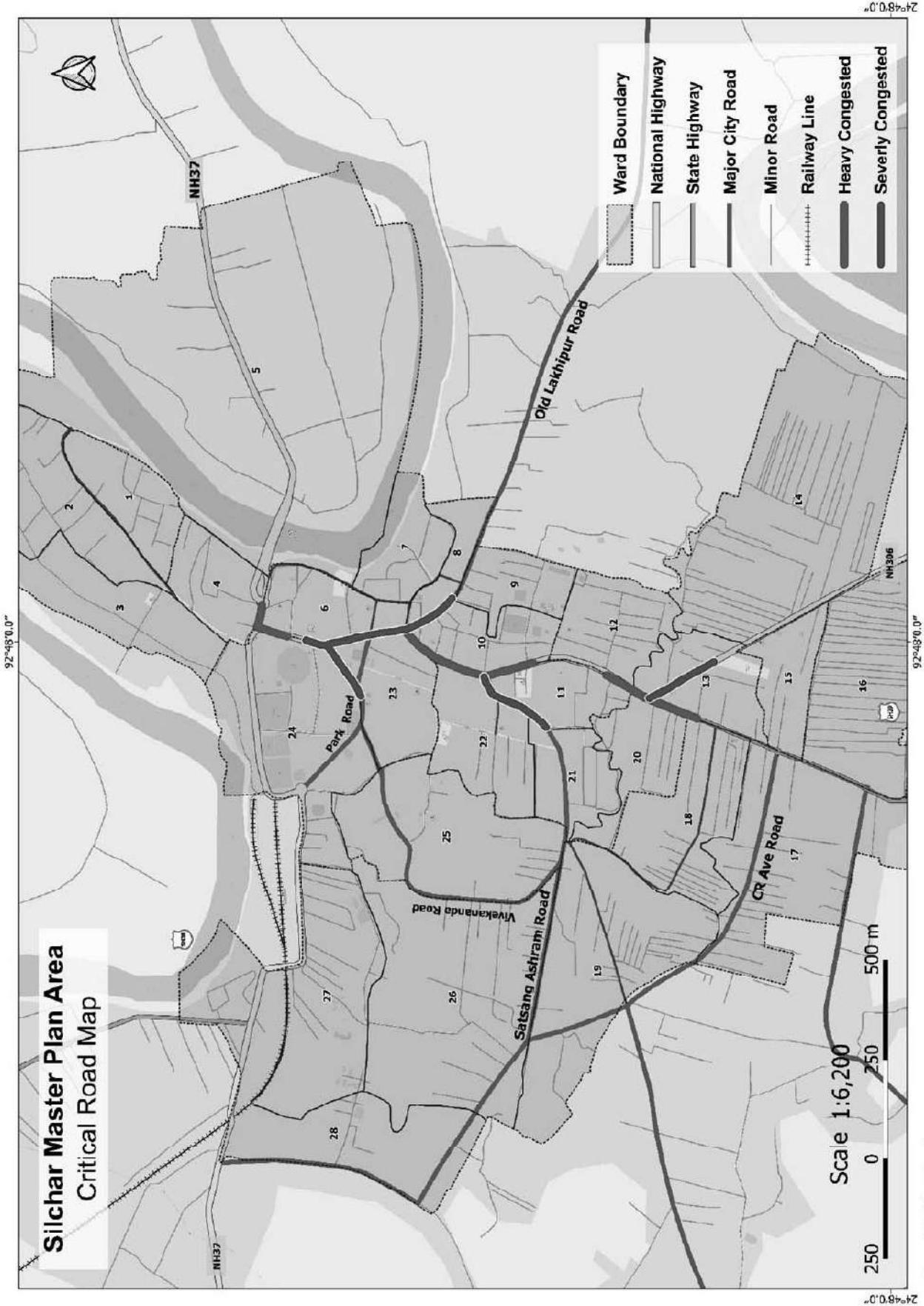
Figure 116 Critical Road map

24°48'0.0"

92°48'0.0"

92°48'0.0"

24°48'0.0"

Silchar Master Plan Area
Accident Prone

Scale 1:6,200

| Ward Boundary |
| National Highway |
| State Highway |
| Major City Road |
| Minor Road |
| Railway Line |
| Heavy Congested |
| Severly Congested |
| ACCIDENT PRONE |

Figure 117 Accident prone area and junctions
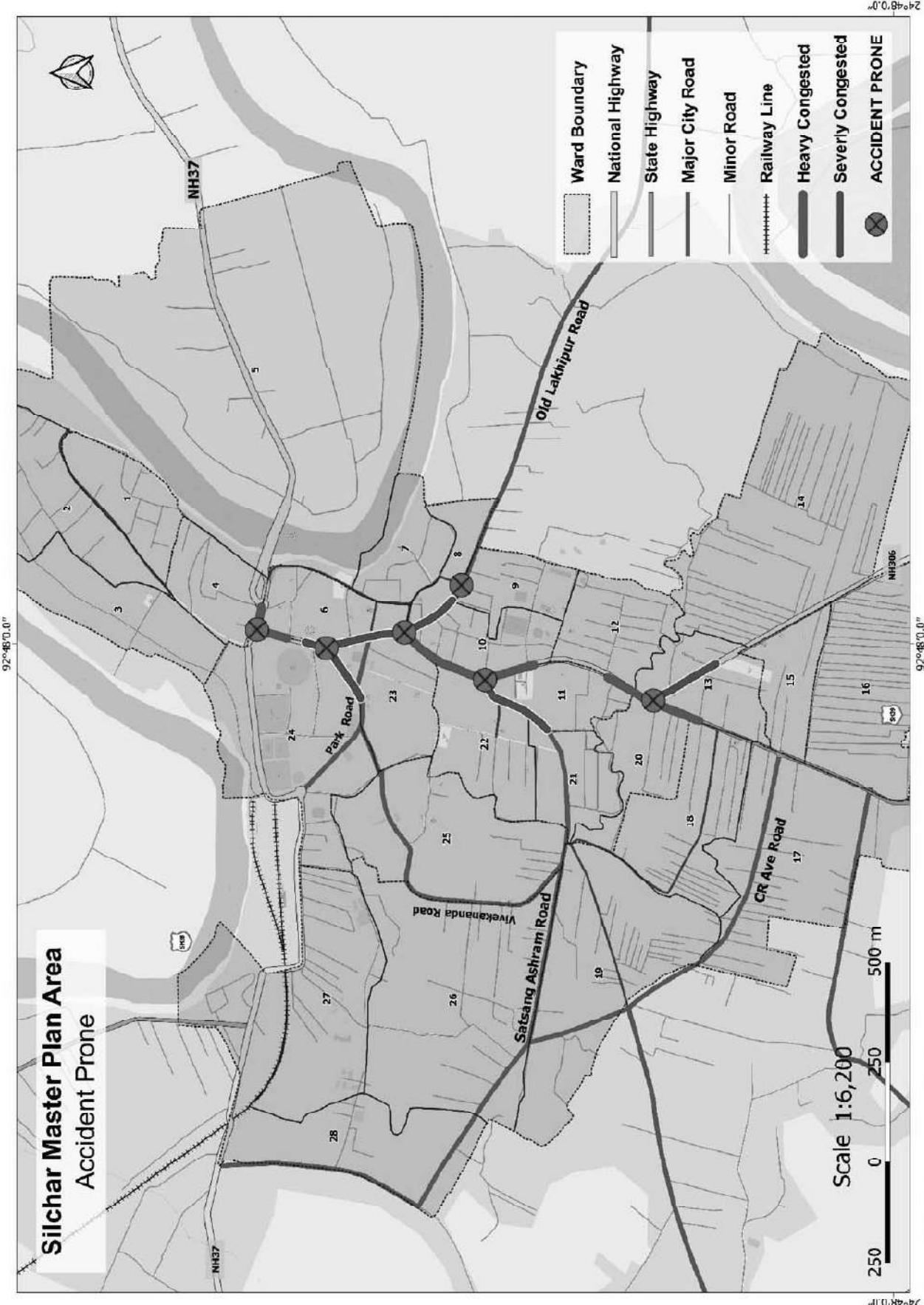
6.6 VEHICULAR TRAVEL PATTERN

The travel pattern of vehicles in the project area was studied. The data collected from the field was subsequently grouped according to origin and destination of vehicles, which led to development of the zoning system The Roadside Interview method, as detailed in IRC: 102-1988, has been adopted for O-D survey. The survey has been carried out for both passenger and goods vehicles for 12 hours (in both directions). For this purpose, cars (including new and old technology cars) and buses were considered as passenger vehicles. Similarly, LCVs, 2-Axle Trucks, 3-Axle Trucks, 4-6 Axle Trucks and >=7-Axle Trucks were considered as goods vehicles. Trained enumerators under the supervision of Traffic Police collected the travel information.

6.6.1 ZONING SYSTEM

Origin-Destination (OD) analysis is required for designation of the PIA in terms of codified origin and destination zones. It is thus important to code the trips recorded at site for origin and destination zones. The zoning, emanating from the understanding of the surrounding road network and the travel pattern of the vehicles by the consultants, was done in four levels. In the first level, all-important towns located along the study stretches were assigned zone code. Secondly, immediate influence areas of study stretches were considered, and nearby areas/ towns were defined as.

6.6.2 DATA CODING AND CHECKING

The collected data were coded and computerized. Checking of data for incorrect entries and coding was carried out by cross checking with original field data sheets. The data were also checked for inconsistencies. The checking included:

- Code number exceeding highest code
- Matching vehicle type with commodity carried
- Vehicle type with their corresponding lead/load/occupancy for any inconsistencies.

6.6.3 DEVELOPMENT OF ORIGIN-DESTINATION MATRICES

After coding of Origin and Destination data, expansion factors were calculated by comparing the sample size collected for each vehicle type with traffic count data. After calculating expansion factors, Vehicle wise O-D matrices were developed. Based on O-D matrices, travel pattern of the vehicles moving on the project road was determined. The O-D matrices of all 6 locations were combined to arrive at the project O-D matrix.

6.6.4 COMMODITY ANALYSIS

Commodity movement pattern shows that there is considerable movement of mining products, food grains & other agricultural products, finished & manufactured products and building materials. A large proportion of empty vehicles were also recorded. Mode-wise distribution of various commodities is presented in Table 134.

Table 134 Vehicle Wise Commodity Distribution (In Percentage)

Sr. No.	Commodity Analysis	LCV	MCV	HCV	MAV
1	Food grains, other agricultural products	14	3	0	0
2	Fruits, vegetables – perishables	15	1	0	0
3	Wood, Forest Products	0	0	0	0
4	Petroleum, oil, gas, lubricants	5	0	0	0
5	Minerals, chemicals, fertilizer	10	0	0	0
6	Iron, metal, steel	1	0	0	0
7	Finished & manufactured products	5	1	0	0
8	Building materials	12	3	0	0
9	Mining materials (Sand, Bajri, Coarse Aggregate)	2	4	0	0
10	Cement	4	0	0	0
11	Miscellaneous goods (Livestock, Waste, paper etc)	1	1	0	0
12	Empty vehicles	16	1	1	0

6.7 ORIGIN-DESTINATION SURVEY

6.7.1 PASSENGER VEHICLE

The analysis of passenger vehicles shows that maximum traffic (45%) circulates within Silchar City. Traffic between Silchar City and another district observed 20% where major traffic flow plays between Silchar and Lakhipur as 15%.and 9% traffic ply between Silchar and Sonai. Spatial distribution of passenger trips is presented in Table 135.

Table 135 Major Trip Distribution of Vehicles

Between	% Share
Silchar	45
Lakhipur	15%
Sonai	9%
Dalu	8%
Udharbond	3%
Silchar to Rest of Districts	20%

(Source: Consultant Compilation)

6.7.2 FREIGHT VEHICLES

Analysis of goods vehicles shows that 37% freight trips are within Silchar City and 48% freight is from Silchar to another district wherein 12% trip plays to Mizoram city. The trips with Siclar City and Guwahati were recorded at 3%. Table 136 shows the distribution of freight trips.

Table 136 Distribution of freight vehicle

Between	% Share
Within Silchar City	37%
Outside Silchar City	48%
Silchar to Guwahati	3%
Silchar to Mizoram	12%

(Source: Consultant Compilation)

6.7.3 OCCUPANCY AND TRIP PURPOSE

The analysis of OD data for passenger cars and Auto rickshaws shows that the average occupancy for these vehicles along the project road is 2 and 3. It is observed that the major share of trips is related to work. The distribution of car passengers by trip purpose is shown in Table 137.

Table 137 Distribution of Car Passengers by Trip Purpose

Trip Purpose	% Trips
Work	28%
Work + Education	61%
Business	2%
Shopping	8%
Others	1%

(Source: Consultant Compilation)

6.7.4 MODE PREFERENCE BY CITIZENS

Auto rickshaw is the major preferable mode of transport for localities as parking availability and road width is major constraint to citizens. Two-wheelers has second preference while car comes on third preference. Pedestrian comes on priority rather than using NMT mode of transport.
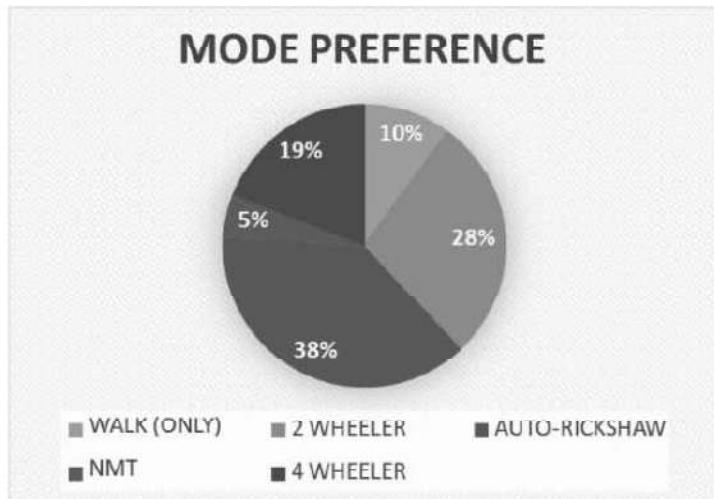
6.8   JUNCTION ANALYSIS

The areas with major traffic congestion have been marked (refer figure 97) with red spots. These are the areas where most of the problems generate due to various reasons and lead to congestion. These areas include Central point, Park road point, Janigunj point, Nahata point, Ambicapatty Junction and Rangerkhari Junction.

6.8.1   INTERSECTIONS AND ITS TYPES

All the differentiated categories of junctions have been mentioned in the tabled below. Table 138 represents the roundabouts and rotaries, table 133 represents all the cross junctions, table 140 shows the Y-junctions and table 135 shows the T-junctions in Silchar Master plan area.

Table 138 List of Rotaries in Silchar MP area

Sl. No.	Roundabouts/Rotary
1.	CR avenue – Meherpur road
2.	Silchar – Imphal road
3.	Park road – Trunk road

(Source: Compiled by Consultants)

Table 139 List of cross junctions in Silchar MP area

Sl. No.	Cross Junctions
1.	Silchar road -Narshing tola-tula patty
2.	CR avenue -Chaengkuri road
3.	Silchar bypass- Chaengkuri road
4.	Khatal road-Shiv mandir road
5.	Meherpur road – Awaltila road

(Source: Compiled by Consultants)

Table 140 List of Y - Junctions in Silchar MP area

Sl. No.	Y - Junction
1.	Park road – Club road
2.	Fatak bazaar road – SS Paul road
3.	Ambicapatty -Hospital road
4.	Satsung Ashram road – Chaengkuri road
5.	Meherpur road -Mizoram road

(Source: Compiled by Consultants)

Table 141 List of T - Junctions in Silchar MP area

Sl. No.	T - Junction
1.	NH-37- to Silchar bypass
2.	NH-37 – SH-38
3.	NH-37-Satsung ashram road
4.	NH-37 – Club road
5.	Park road to Narshing Tola
6.	Khatal road- Mizoram road
7.	Satsung ashram road – CR avenue
8.	Park road-Assam rifle officers' colony

(Source: Compiled by Consultants)

The map below shows the analysis of junctions whether the junction is cross junction, T-junction, Y-junction, or Rotary (refer figure 118).
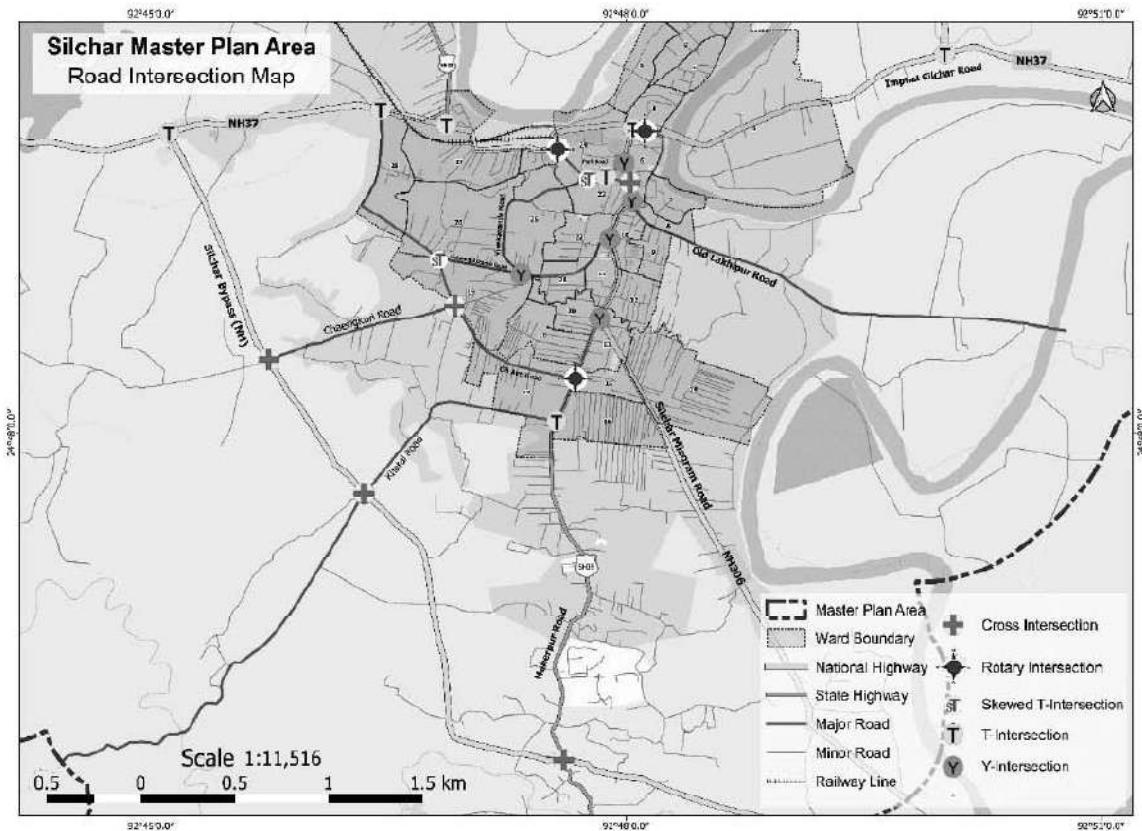

Figure 118 Road intersection map of Silchar MPA

Major intersection nodes of SMPA are described in Fig 118 and the points selected for intersection (Junction) analysis are marked in Fig.119.
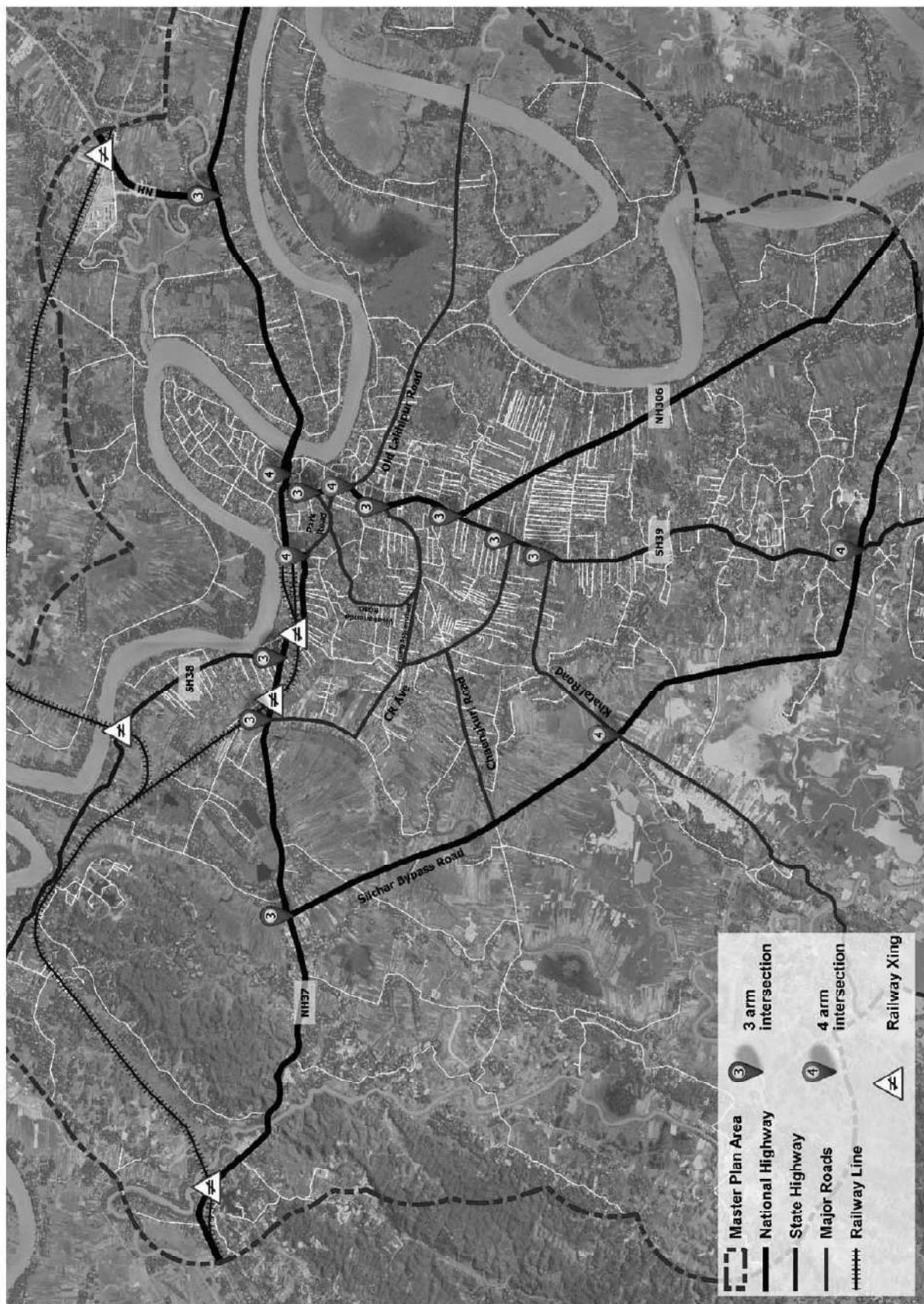
Figure 119 Three and Four arm intersections

Silchar Master Plan Area
Traffic Congestion Spot

Scale 1:11,725

Master Plan Area
National Highway
State Highway
Major City Road
Minor Road
Railway Line
Congestion Point
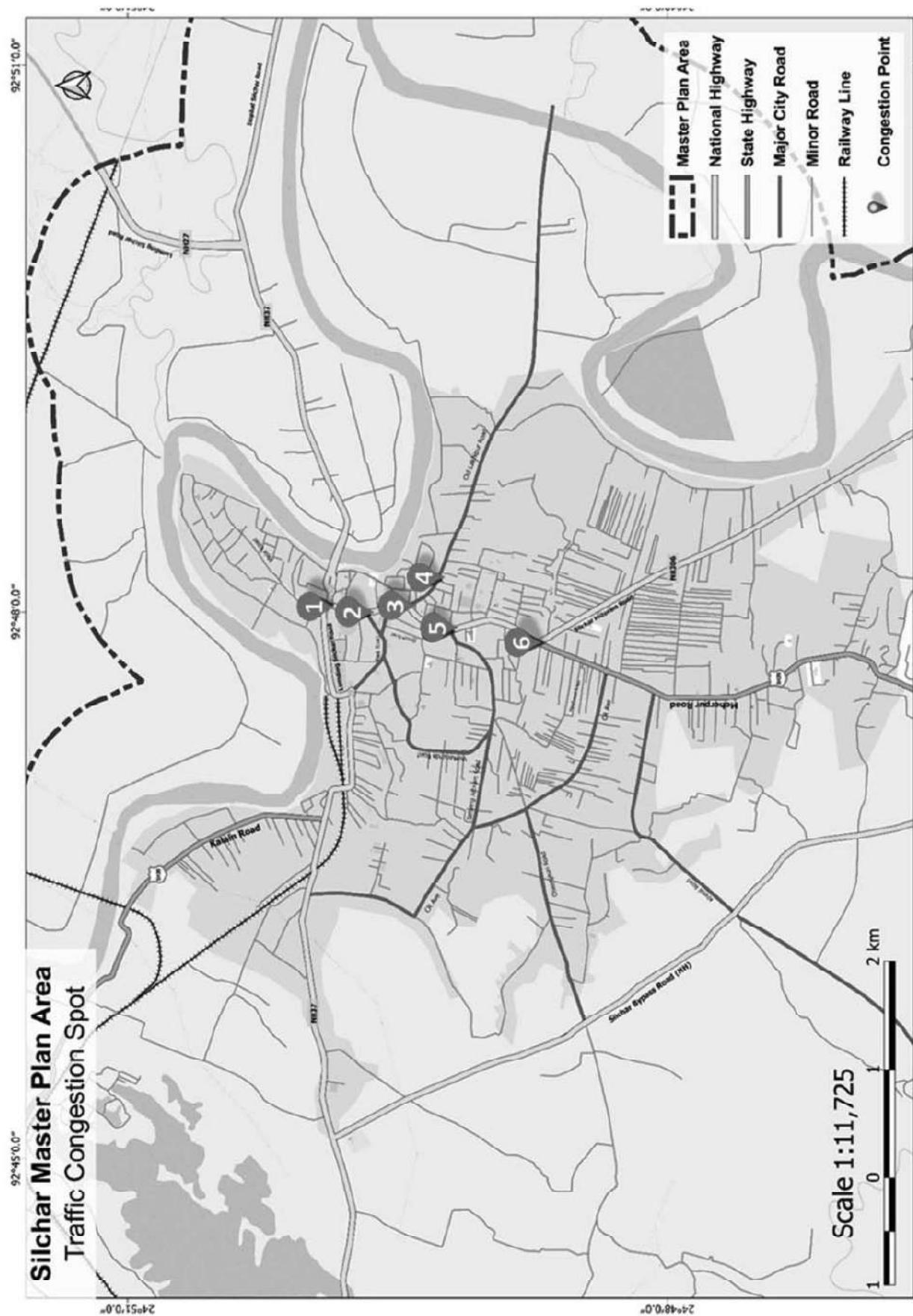
Figure 120 Major nodes of intersections

6.8.2 INTERSECTION – 1 (SADARGHAT ROAD & CLUB ROAD JUNCTION)

Table 142 Intersection 1 Traffic Congestion Details

Road	C. W. Width (m)	No. of Lanes	Shoulder + Footpath Width (m)	Peak Congestion Hours
Club road (NH-306)	7	2 lanes undivided Two-way	4	10:00 hrs. &11:00 hrs.
Sadarghat road (NH-37)	7.5	2 lanes undivided Two-way	3	

(Source: Compiled by Consultants)
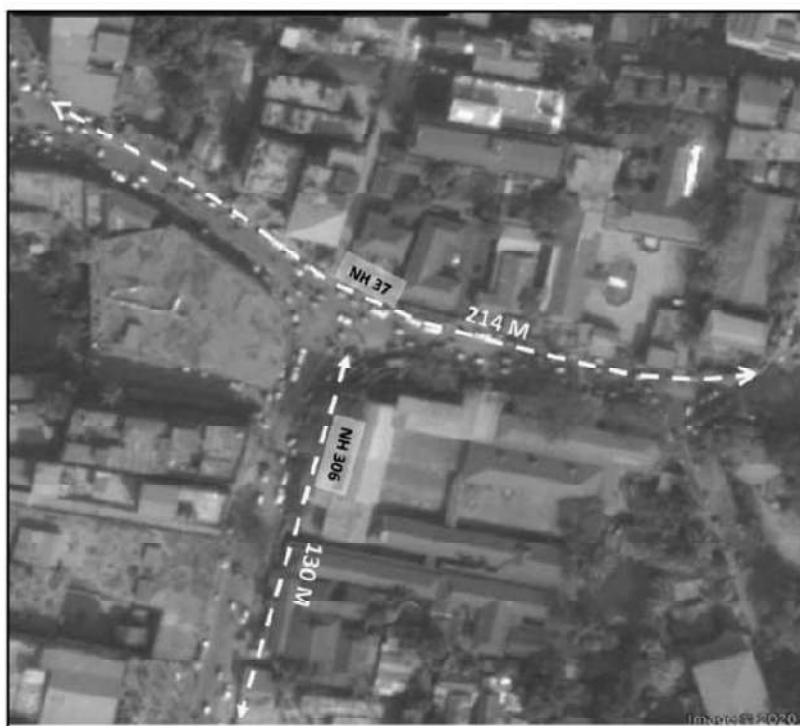
Figure 121 Queuing Length of Intersection 1

This Junction is a 3-Arm junction and the total daily traffic at Club road (NH 306) and Itkhola road at Central point is 14479 PCU. The peak hour and peak hour traffic at the junction is presented in Table 143.

Table 143 Peak hour traffic at Central point

Peak Hour	10:00-11:00
Peak Hour Traffic (PCU/hr)	1147

(Source: Compiled by Consultants)

The current capacity of junction may be improved by removing encroachment, electricity poles and vendors along with geometric improvement and signalisation.

Table 144 Veh/Day at Club road (NH-306) and Sadarghat Road (NH-37)

Location	Minor Road (Veh/day)	Major Road (Veh/Day)
Central point	13053	14223

(Source: Compiled by Consultants)

6.8.3 INTERSECTION – 2 (CENTRAL ROAD & PARK ROAD JUNCTION)

Table 145 Intersection 2 Traffic Congestion Details

Road	C. W. Width (m)	No. of Lanes	Shoulder + Footpath Width (m)	Peak Congestion Hours
Central road	6	2 lanes undivided Two-way	2	16:00 hrs. &17:00 hrs.
Park Road	6	2 lanes undivided Two-way	2	

(Source: Compiled by Consultants)

Figure 122 Queuing Length of Intersection 2

Park road point is a 3-Arm junction and the total daily traffic at this Junction is 20068 PCU. The peak hour and peak hour traffic at the junction is presented in Table 146.

Table 146 Peak hour traffic at Park road Junction

Peak Hour	16:00-17:00
Peak Hour Traffic (PCU/hr)	1821

(Source: Compiled by Consultants)

The current capacity of junction may be improved by removing encroachment, electricity poles and vendors along with geometric improvement, channelization, and signalisation.

Table 147 Veh/Day at Park road Junction

Location	Minor Road (Veh/day)	Major Road (Veh/Day)
Park road	18566	21997

(Source: Compiled by Consultants)

6.8.4 INTERSECTION – 3 (JANIGUNJ JUNCTION)

Table 148 Intersection 3 Traffic Congestion Details

Road	C. W. Width (m)	No. of Lanes	Shoulder + Footpath Width (m)	Peak Congestion Hours
Hailakandi road	6	2 lanes undivided Two-way	2	09:00 hrs. to 10:00 hrs.
Fatak Bazar road	6	2 lanes undivided Two-way	1	

(Source: Compiled by Consultants)

Figure 123 Queuing Length of Intersection 3

Janigunj Junction is a 3-Arm junction and the total daily traffic at junction is 12723 PCU. The peak hour and peak hour traffic at the junction are presented in Table 149.

Table 149 Peak hour traffic at Janigunj Junction

Peak Hour	10:00-11:00
Peak Hour Traffic (PCU/hr)	1428

(Source: Compiled by Consultants)

The current capacity of junction may be improved by removing encroachment and electricity poles along with geometric improvement, channelization and signalisation.

Table 150 Veh/Day at Fatak bazar road and NH-306

Location	Minor Road (Veh/day)	Major Road (Veh/Day)
Janiganj Junction	11820	12205

(Source: Compiled by Consultants)

6.8.5 INTERSECTION – 4 (NAHATA JUNCTION)

Table 151 Intersection 4 Traffic Congestion Details

Road	C. W. Width (m)	No. of Lanes	Shoulder + Footpath Width (m)	Peak Congestion Hours
Fatak Bazar road	6	2 lanes undivided Two-way	1	9:00 hrs.to10:00 hrs.

(Source: Compiled by Consultants)

Figure 124 Queuing Length of Intersection 4

Nahata Junction is a 3-Arm junction and the total daily traffic at junction is 19668 PCU. The peak hour and peak hour traffic at the junction is presented in Table 152.

Table 152 Peak hour traffic at Nahata point Junction

Peak Hour	09:00-10:00
Peak Hour Traffic (PCU/hr)	1477

(Source: Compiled by Consultants)

The current capacity of junction may be improved by removing encroachment, electricity poles and vendors along with geometric improvement, channelization and signalisation.

Table 153 Veh/Day at Nahata point Junction

Location	Minor Road (Veh/day)	Major Road (Veh/Day)
Nahata point Junction	11820	18286

(Source: Compiled by Consultants)

6.8.6 INTERSECTION – 5 (AMBICAPATTY JUNCTION)

Table 154 Intersection 5 Traffic Congestion Details

Road	C. W. Width (m)	No. of Lanes	Shoulder + Footpath Width (m)	Peak Congestion Hours
Ambicapatty road	7	2 lanes undivided Two-way	3	16:00 to 17:00 hrs

(Source: Compiled by Consultants)

Figure 125 Queuing Length of Intersection 5

Ambicapatty Junction is a 3-Arm junction and the total daily traffic at this junction is 26511 PCU. The peak hour and peak hour traffic at the junction is presented in Table 155.

Table 155 Peak hour traffic at Ambicapatty Junction

Peak Hour	16:00-17:00
Peak Hour Traffic (PCU/hr)	2576

(Source: Compiled by Consultants)

The current capacity of junction may be improved by removing encroachment, electricity poles and vendors along with geometric improvement, channelization, and signalisation.

Table 156 Veh/Day at Ambicapatty Junction

Location	Minor Road (Veh/day)	Major Road (Veh/Day)
Ambicapatty	24403	26541

(Source: Compiled by Consultants)

6.8.7 INTERSECTION – 6 (RANGIRKHARI JUNCTION)

Table 157 Intersection 6 Traffic Congestion Details

Road	C. W. Width (m)	No. of Lanes	Shoulder + Footpath Width (m)	Peak Congestion Hours
Meherpur road	14	4 lanes undivided Two-way	3	16:00 hrs. to 17:00 hrs.
Mizoram road	7	2 lane undivided Two-way	4	

(Source: Compiled by Consultants)

Figure 126 Queuing Length of Intersection 6

Rangirkhari Junction is a 3-Arm junction and the total daily traffic at the Junction is 32115 PCU. The peak hour and peak hour traffic at the junction is presented in Table 158.

Table 158 Peak hour traffic at-Rangirkhari Junction

Peak Hour	16:00 to 17:00
Peak Hour Traffic (PCU/hr)	2585

(Source: Compiled by Consultants)

The current capacity of junction may be improved by removing encroachment and electricity poles along with geometric improvement, channelization, and signalisation.

Table 159 Veh/Day at NH 37-Rangkhari Junction

Location	Minor Road (Veh/day)	Major Road (Veh/Day)
Rangkhari junction	28238	31060

(Source: Compiled by Consultants)

6.9 PEDESTRIAN SURVEY

Pedestrian survey was conducted both along the road and across the road near Ambicapatty road, Central point, College road, Nazir patty, Rangirkhari and Meherpur road.
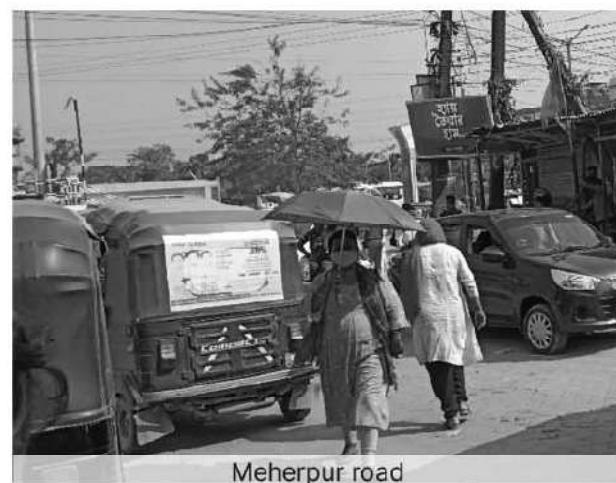
Figure 127 Pedestrian Survey

Table 160 Footpath inventory

Location	Peak Hour	Passenger Flow	Existing Footpath width (m)	Required Footpath (m)
Ambicapatty	12:15 – 13:15	343	1.3	1.5
Bhowal point	11:15 – 12:15	1195	1.5	1.5
College road	11:00 – 12:00	328	0	1.5
Nazir patty	12:30 – 13:30	1346	0.9	1.5
Rangirkhari	13:30 – 14:30	824	1.06	1.5
Meherpur Road	14:30 -15:30	502	0	1.5

(Source: Compiled by Consultants)

IRC 103 recommends the minimum footpath width as 1.5m. Hence it is recommended that the footpath width on Ambicapatty, Nazir patty, Rangirkhari need to be increased to 1.5m. Pedestrian-vehicular conflict can be effectively studied through the indicator PV2 suggested in IRC 103, Guidelines for Pedestrian Facilities'. The code suggests some form of control measures at mid blocks and intersections where the indicator PV2 is greater than or equal to 1 x 108 for undivided carriageways where 'P' is the peak hour pedestrian volume and 'V' is the number of vehicles in that peak hour. Analysis of the peak values for PV2 and the hour in which the same is observed is presented in Table 161.

Table 161 Pedestrian Cross traffic survey

Location	Peak Hour	P	V	PV2/108
Ambicapatty	12:15 – 13:15	343	2576	22.76
Bhowal point	11:15 – 12:15	1195	1821	39.62
College road	11:00 – 12:00	328	2576	1.8
Nazir patty	12:30 – 13:30	1346	1272	21.77
Rangirkhari	13:30 – 14:30	824	2387	46.94
Meherpur Road	14:30 -15:30	502	2585	33.54

(Source: Compiled by Consultants)

Huge pedestrian traffic volume is observed along the links and intersections within the core areas – as walking is predominant modes of movement. Most of the links do not have adequate footpaths on both sides to accommodate the high pedestrian volume. Many Streets observed with huge encroachment on footpaths by local vendors and commercial facility owners which forcing pedestrians to move along the carriageway.

From above calculation it clearly indicates the road which are dominated by high pedestrian footfall are in dire need for pedestrian friendly walkways with robust street infrastructure and enough walkway width. It can be clearly observed from the images mentioned above that the pedestrian crossings and vehicular movements are at high risk and seems unsafe as there is no traffic control and regulations been followed, hence there are high chances of conflict between these two modes of traffic.

The major deficiencies are:

1. Inadequate/irregular riser and tread

2. Poor surface condition

3. Poor illumination

4. Lack of railing and landing facilities for long flight of steps

5. No pedestrian crossing facility and zebra crossing marks

6. In adequate traffic control infrastructure on major nodes.

As walking is the effective Non-Motorized Transit (NMT) mode, management of pedestrian facilities along with steps and accessibility on footpaths can significantly boost the patronage for NMT movement within SMPA.

6.10 SPEED DELAY SURVEY

The survey was conducted along four major travel corridors. Journey and Running speeds derived from the survey in the two directions of travel are presented in Table 162.

Table 162 Observed Speed along Project road

Sr. No.	Road Section	Direction	Journey Speed (kmph)	Running Speed (kmph)
1.	Ambicapatty	Ambicapatty to Civil Hospital	22.4	33.5
		Civil Hospital to Ambicapatty	23.6	31.6
2.	Bhowal point	Devdoot point to Ukilpatty road	19.8	25.4
		Ukilpatty road to Devdoot point	23.4	32.5
3.	College road	Ambicapatty Point to GC College	24.5	33.6
		GC College to Ambicapatty Point	26.6	32.3
4.	Nazir patty	Tula patty to SS Paul road	19.5	29.4
		SS Paul to Tula Patty	21.3	31.7
5.	Rangirkhari	Rangirkhari point to Kanakpur	29.6	35.4
		Kanakpur road to Rangirkhari	34.4	42.1
6.	Meherpur Road	Bank of India to Tarani Road	28.5	38.4
		Tarani Road to Bank of India	31.7	35.1

(Source: Compiled by Consultants)

The low values of Journey and Running speeds indicate major congestion. Thus, intervention is required to relieve congestion through capacity augmentation and traffic management.

Gandhi Bag

6.11 PARKING STUDY

The parking of vehicles needs extensive and exclusive land area. On street parking is found all over Silchar and usually observed spill over to other use areas like road carriageway, footpaths and open spaces. In turn they affect safety and environmental quality. Parking characteristics within the town vary by areas, by land use activities and by time period. In residential areas it is by private vehicles and of long-term duration during the night hours. In central areas it is of mixed type – private and public vehicles, passenger and goods vehicles and of short term and long-term needs. In warehousing and wholesale market areas it is predominantly of LCVs and goods vehicles.

A space occupied by vehicle for a particular period of time when it is not under any use can be known as parking. If any vehicle comes on road, it always requires a parking to rest as a human requires bed to rest for a particular time period, so it is recommended in these days for any busy landuse activity to come up with proper parking plans for required number of vehicles. The parking in urban areas is found to be of two types namely on-street parking which is done on the side of streets with space provided and other is off-street parking which is a modern concept and is done when there is a lack of space in the urban area.

6.11.1 EXISTING PARKING AVAILABILITY

The parking areas are an important component in the urban transportation network. The parking areas become very important in the Central Business District areas (CBD) and public activity area, where the traffic movement is very heavy. At present around 0.10 hectare of two parking spaces in Railway Station premises have been utilized as public car and two-wheeler parking area. There is no such Municipal identified parking area designated for public parking within planning area. Presently, one site of 1.31 hectare is been allocated as ISTT to be utilized as HMV vehicle parking area but due to some reasons no parking for Trucks and HMVs observed in this space.

Table 163 Parking Spots and their Area Coverage

Parking Space/Area	Location	Type of Parking	Area (Hectare)
Silchar Railway Parking-1	NH-37, Station road	organized ground level parking	0.10
Silchar Railway Parking-2	Station Road	unorganized ground level parking	

(Source: Compiled by Consultants)

At present there is no multilevel organized parking facility been provided within CBD area under local body control.

Presently, the unidentified and unauthorized on-street parking has been practiced in the entire Silchar town area where heavy traffic movement or pedestrian activity is observed. Some streets observed spill over with haphazard parking and therefore the accessibility on carriageways remain encroached and insufficient which leads to frequent traffic jams and booming with congestions. This trend of haphazard parking in entire core city area makes the vehicular and pedestrian flow unsafe and inadequate.
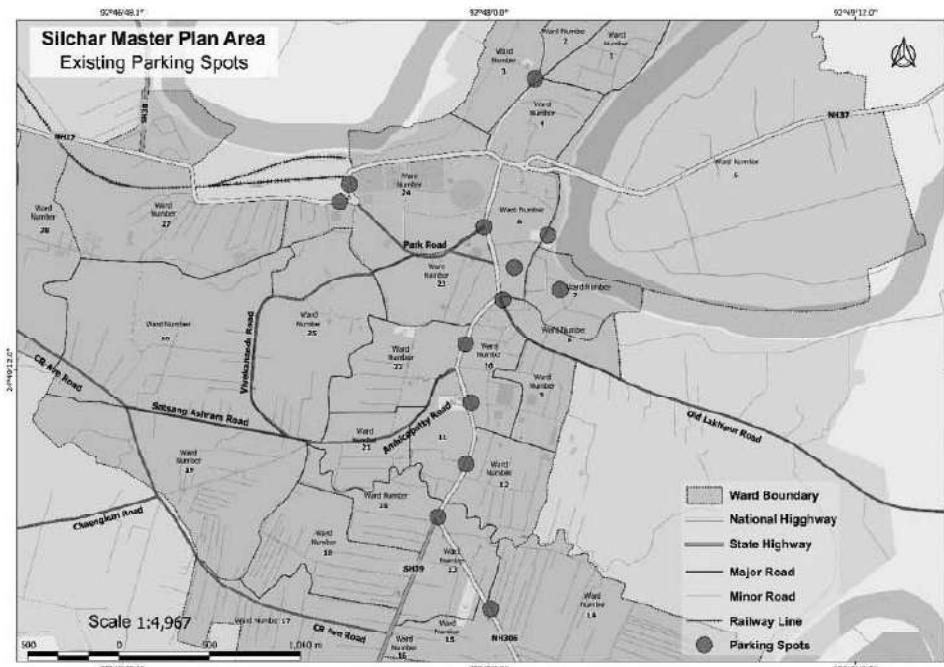
Figure 128 Places with unauthorised parking

Highlighted spots in above figure are the places usually observed with on-street parking one side or both side of the roads. The entire stretch of NH-306 within city central area majorly known as Central road witnesses the haphazard parking trend. Many major road intersection areas like Devdoot point, Janigunj, Nazir Patty, Ambicapatty, Nahata point and Rangirkhari usually spill over with haphazard parking trend due to unavailability of designated off-street and on-street parking spaces. Some images witnessing parking trend are mentioned further.

Figure 129 Parking survey

Rangirkhari Point

Meherpur Road Point

6.11.2 PARKING SURVEY

High ownership pattern and excessive dependence on private mode of movement, i.e., two-wheelers and cars exert huge parking demand. As most of the parking demand is met by on-street facilities due to absence of designated off-street facilities, leading to traffic congestion in the core area.

Parking survey was conducted at on street locations where vehicular parking was observed. On-street parking is observed to be high on Rangirkhari and Meherpur Road. The percentage of vehicles parked for long-term (>1 hr) is high at the two locations constituting 93% at Rangirkhari and 84% at Meherpur Road. On rest of the market road the parking demand is high but majority for short term. Analysis of parking demand is presented in Table 164.

Table 164 Existing Parking Demand in Equivalent Car Space

Sr. No.	Location	Parking Type	Peak Accumulation (ECS)	Peak Hour
1	Ambicapatty	On street	85	12:15 – 13:15
2	Bhowal point	On street	97	11:15 – 12:15
3	College road	On street	49	11:00 – 12:00
4	Nazir patty	On street	88	12:30 – 13:30
5	Rangirkhari	On street	115	13:30 – 14:30
6	Meherpur Road	On street	125	14:30 -15:30

Table 165 Parking Demand Capacity Analysis

Sr. No.	Location	Demand (ECS)	Capacity (ECS)
1	Ambicapatty	85	No Designated Parking Available
2	Bhowal point	97	No Designated Parking Available
3	College road	49	No Designated Parking Available
4	Nazir patty	88	No Designated Parking Available
5	Rangirkhari	115	No Designated Parking Available
6	Meherpur Road	125	No Designated Parking Available

As evident from the above table 165, the parallel parking spaces on main bazar road is highly demanded and its unavailability leads to sever encroachment on street, that on Ambicapatty Road, Bhowal point road, Nazir patty and Rangirkhari, no designated parking space available which leads to encroachment on most patches. After haphazard parking of vehicles, only about 5m width of carriageway remains accessible for vehicular movement at the mentioned locations. Interference to through traffic is caused during parking, un-parking operations of vehicles. During reconnaissance survey, On-street Parking has been observed at various locations like Club road, Sadarghat road, Park Road, Tarapur intersection, and Itkhola Road in Silchar Planning Area leading to massive congestion and decreasing the road capacity. In view of this, there is dire need for providing off street parking facility in potential commercial areas or in proximity in CBD area. Multi-level parking can be resorted to provide the needed parking facilities.

6.12 ISSUES AND REQUIREMENTS

6.12.1 ADHOC VENDING

- One of the major issues is of illegal vending on walking shoulders on the main streets.

- Due to this illegal vending sometimes the actual accessible patch of road decrease to half lane only.

- If proper spaces are being allocated to street vendors in every zone the issue can be eliminated.

- Due to illegal possession of shoulders the pedestrian come down to road for their local trip and some time proves unsafe on congested area.

- Narrow road network with restricted capacity, particularly due to the illegal vending, resulting in congestion and loss of productivity.

- The problematic areas include Intersection of Sadarghat point, Park road junction, Janigunj junction, Nahata junction i.e., near Fatak Bazaar road, Rangirkheri junction area and Ambicapatty junction and along the Ambicapatty road. etc.

- The photographs below depict the current scenario of the illegal vending zones which restricted the capacity of road which in result lead to congestion.

- The illegal vending zone locations have been marked on the map (Fig. 130.)
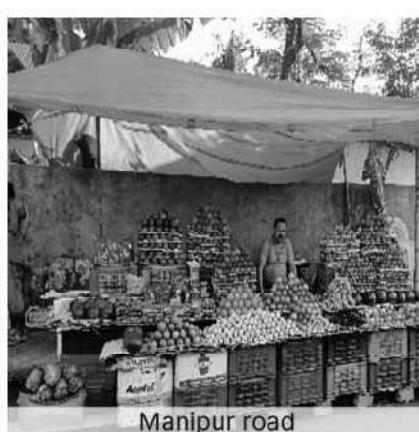
Central road   Manipur road   Ambicapatty road
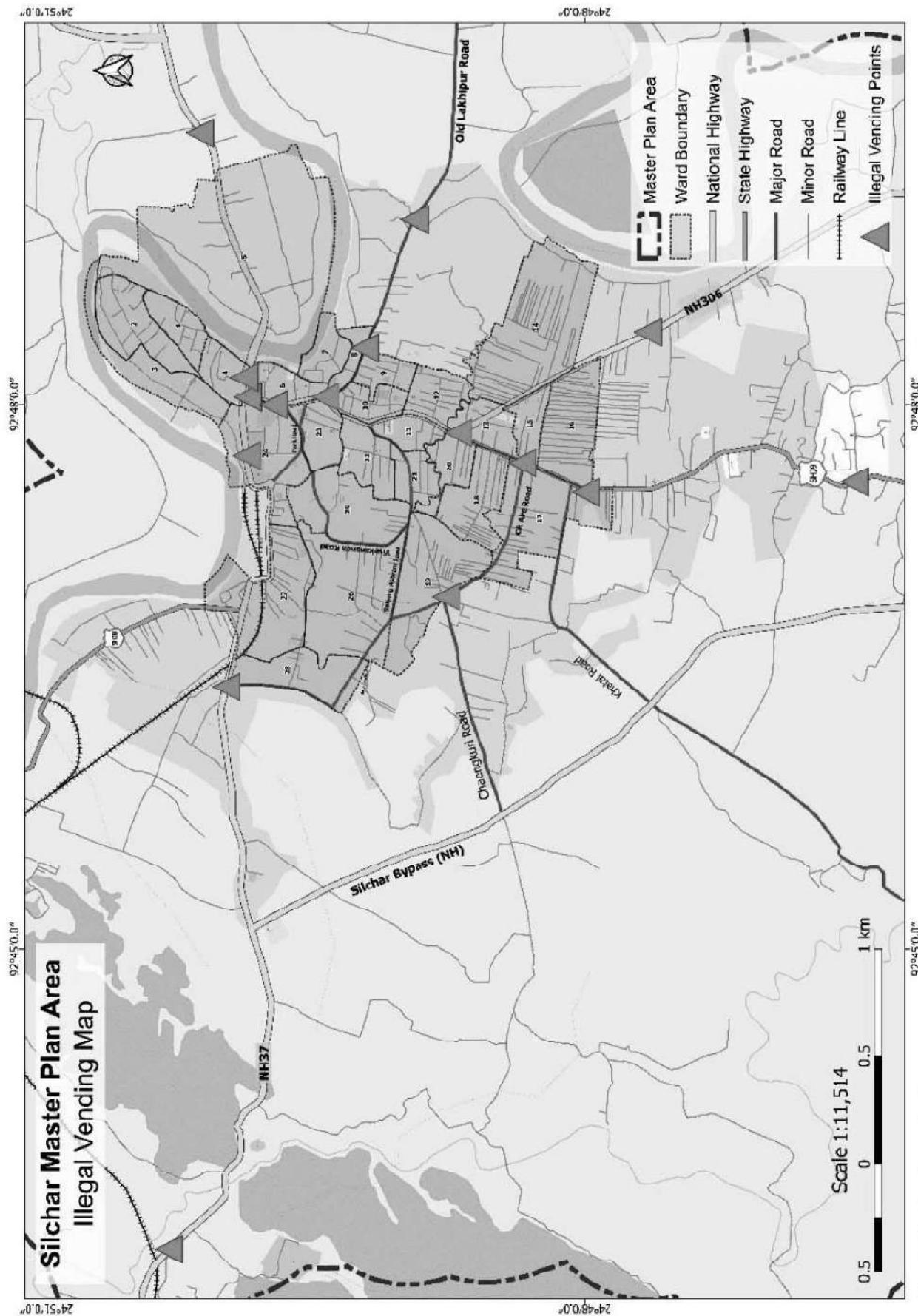
Figure 130 Illegal vending zone locations

6.12.2 TRAFFIC CONGESTION

- Traffic congestion is quite common, and it takes a lot of time to commute for the commuters.

- At many places geometry of roads and intersection are not adequate and absence of functional hierarchy of road network leads to the traffic congestion.

- The average roads width of the town is very less as they have not followed any norms and standards for the road pattern as well as for other related things like road cross sections, etc.

- Observed encroachments on the footpath by vendors, which acutely rise the traffic congestion between **Club road and Park junction, continuing towards central road** and parking on both sides of the road and the resultant traffic need to resolve.

- Many vehicles, due to lack of adequate parking facilities, were parked on the park road, causing inconvenience to people who use the field for recreational purposes like walking and playing and people had to face inconvenience as that road connect to important roads like **NH-37 and NH-306.**

- Other roads having traffic congestion are **NH 306 (Capital Road), Janigunj to Ambicapatty and Rangirkhari junction** having C.W. of 8 metres, Park Road Tula patty Road (6.5 meters) and Narshing tola (6 meters).

- The highlighted light blue patches in map within town area shows the frequent congested road patches (Fig. 132)
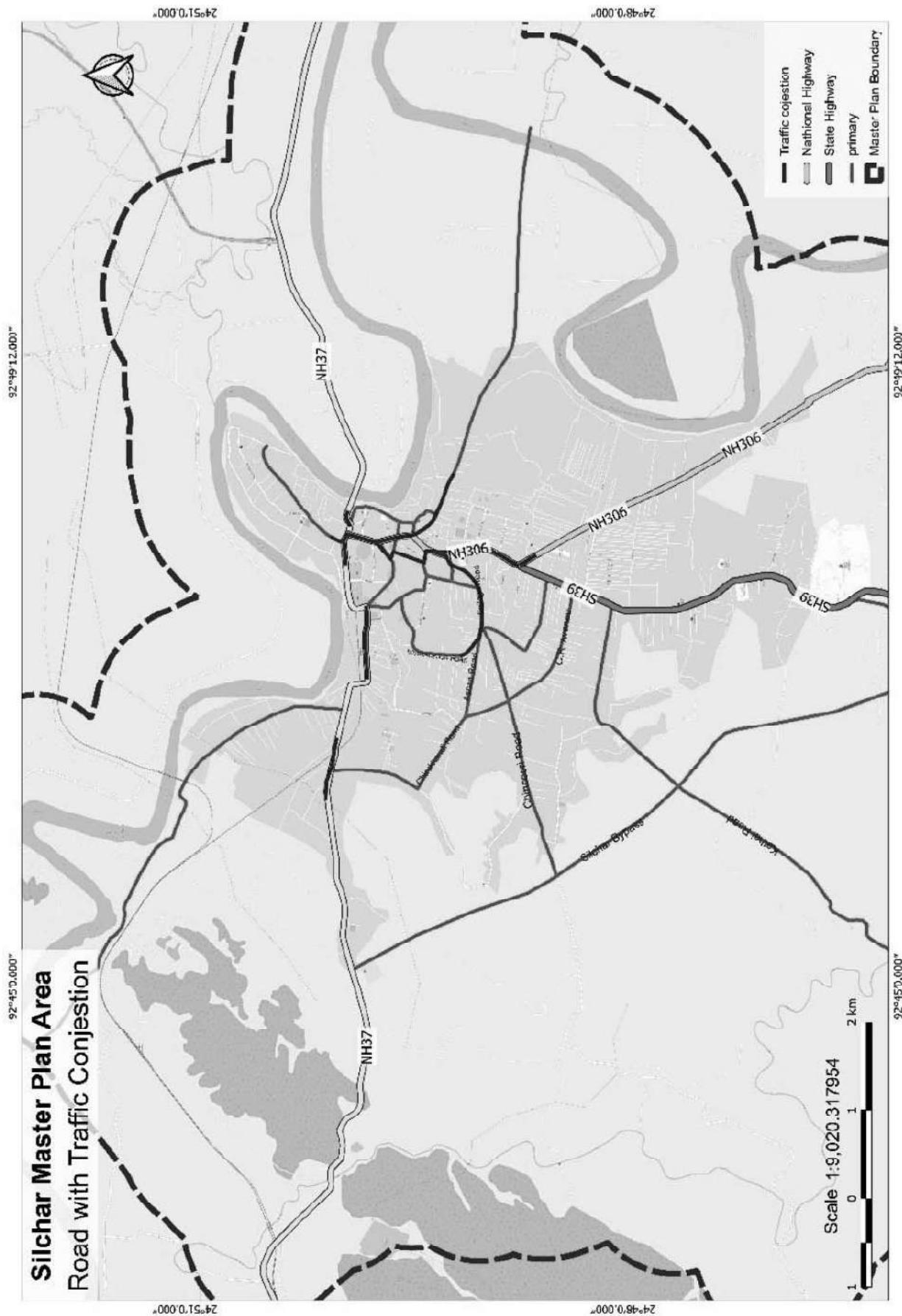
Figure 131 Traffic Congestion map of Silchar Master Plan Area

6.12.3 ROAD ENCROACHMENTS

- Many factors can be listed out for such happenings, but few observations are mentioned below, which are

- Unauthorized parking of vehicle on pavement only.

- Many spots with exposed electric poles on pavement sides which leads to make space dead and potential for parking wheels.

- The town suffers from parking problems due to encroachment by vendors on road and off-street parking. As a result, the road width decreases and there is no space remaining to pass the vehicles or to give space to other vehicles.

- There is no designated space for parking in whole town.

- There are encroachment issues in areas namely both sides of Central point to park road junction, Janigunj junction, Ambicapatty point, Rangirkheri and Nahata junctions are witnessed encroachments along the roads. Other market areas like Devdoot point and Ambicapatty road also have similar encroachment pattern.

- Due to lack of space, it is difficult for vehicles to pass on.

- Also, Proper facilities are needed for loading, uplifting, and downloading.

- Encroachment on both sides of the road decreases the effective width which may cause road accidents and disturbs the smooth flow of traffic.

- The map shows the road network of planning area with identified spots of encroachment on roads (Refer to Figure 132).


Lumbding-Silchar Road

Park Road

Devdoot point
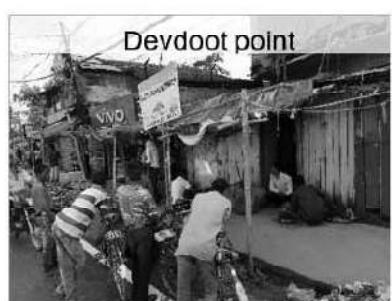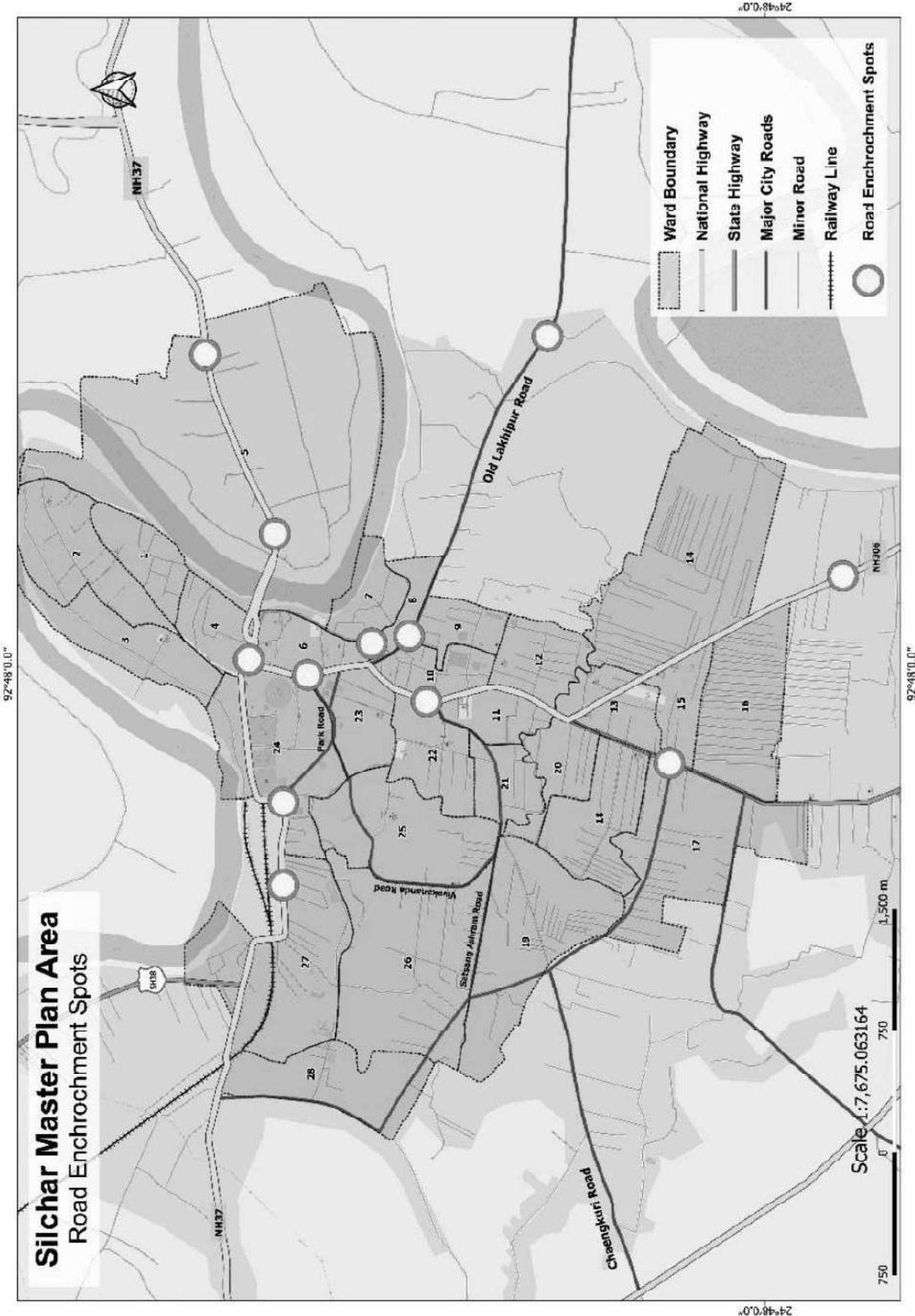
Figure 1.32 Road encroachment areas in Silchar: master plan area

6.12.4 HAPHAZARD PARKING

- With increasing number of vehicles, narrow roads, absence of parking spaces within majority of built areas, parking becomes critical for planning and development.

- There is more of commercial area, so the shopkeepers park their vehicles outside the shops leading to decrease in the width of the road.

- There is no proper arrangement for parking vehicles which results into roadside parking.

- Some of the streets are observed by frequent haphazard parking on side of the pavements.

- Low accessibility and traffic congestion are resulting due to such happenings.

- As per the temporal study the town is growing at fast rate leads to more and more traffic problems like todays it does not have sufficient parking and number of vehicles are increased rapidly which will lead to the parking shortage in the town.

- The areas with illegal parking are near **Club road, Centra road, Lumbding-Silchar road and Ambicapatty road. Major crossing areas like Satsung Ashram road, Chaengkuri road** and around Meherpur road.

- The marked spots on map are regular area for illegal parking (Figure 133).
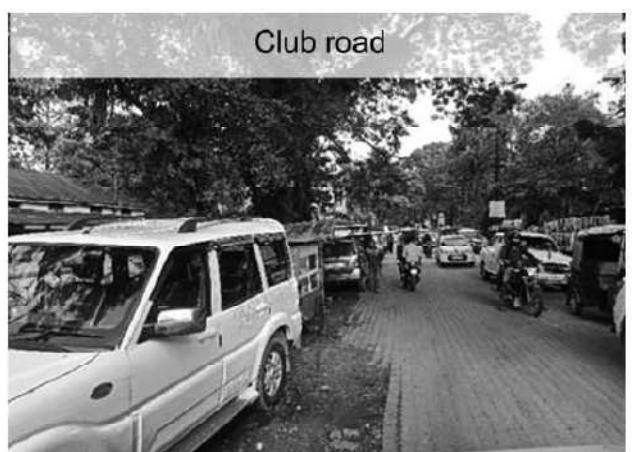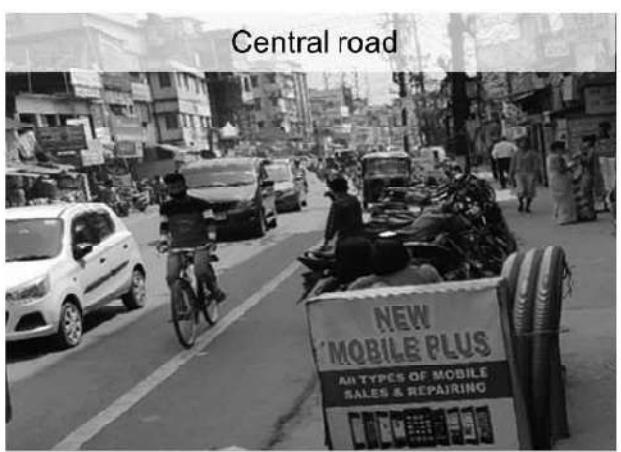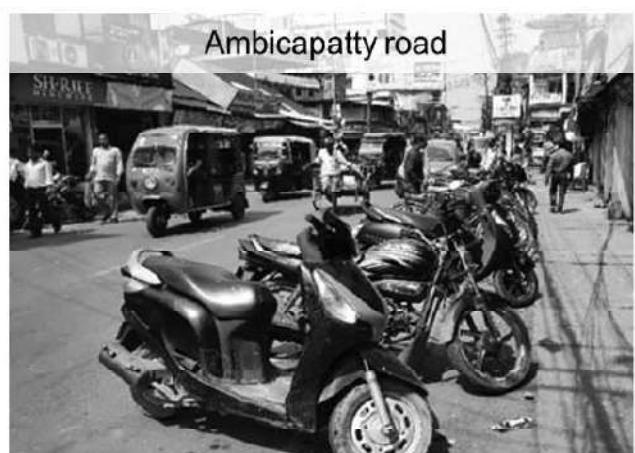
Figure 133 Haphazard parking

6.12.5 JUNCTIONS WITHOUT TRAFFIC SIGNALS

- Many traffic intersections observed with insufficient traffic control facility

- The below mentioned are junction with Non -working traffic signals

- Resulting in unnecessary traffic jams and more requirement of traffic brigade occurs.

- Various junctions without traffic signals are there in town like Park road junction, Central point junction, Janigunj junction, Ambicapatty junction,Nahata point and Rangirkheri Junction and many other crossing areas in Silchar city as no junction is signalized which leads to the poor infrastructure of the road.

- The marked spots on map are junctions without traffic signal (Figure 135).

Figure 134 Junctions without traffic control facilities in road
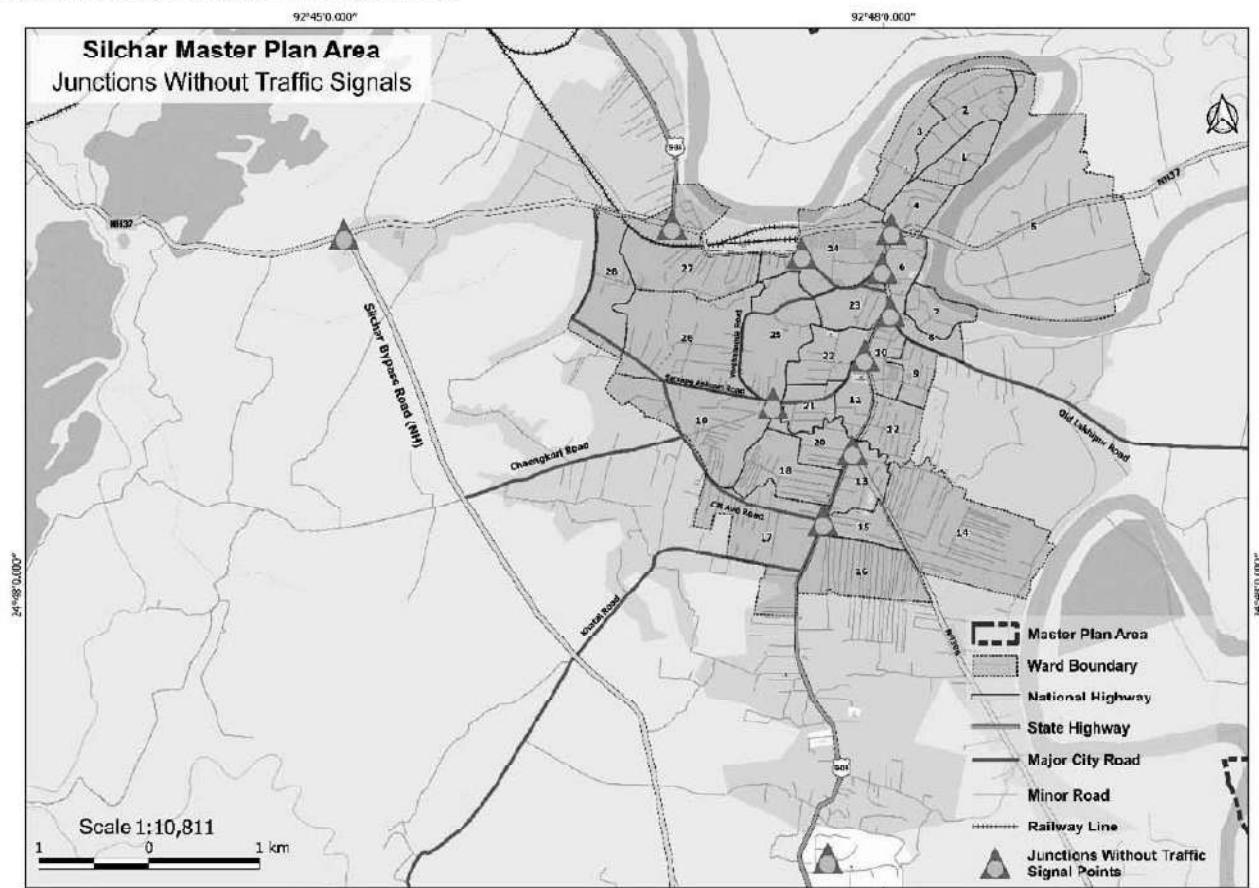
Figure 135 Junctions without traffic control facilities

6.13 PROPOSALS AND RECOMMENDATIONS

6.13.1 RING ROAD PROPOSAL
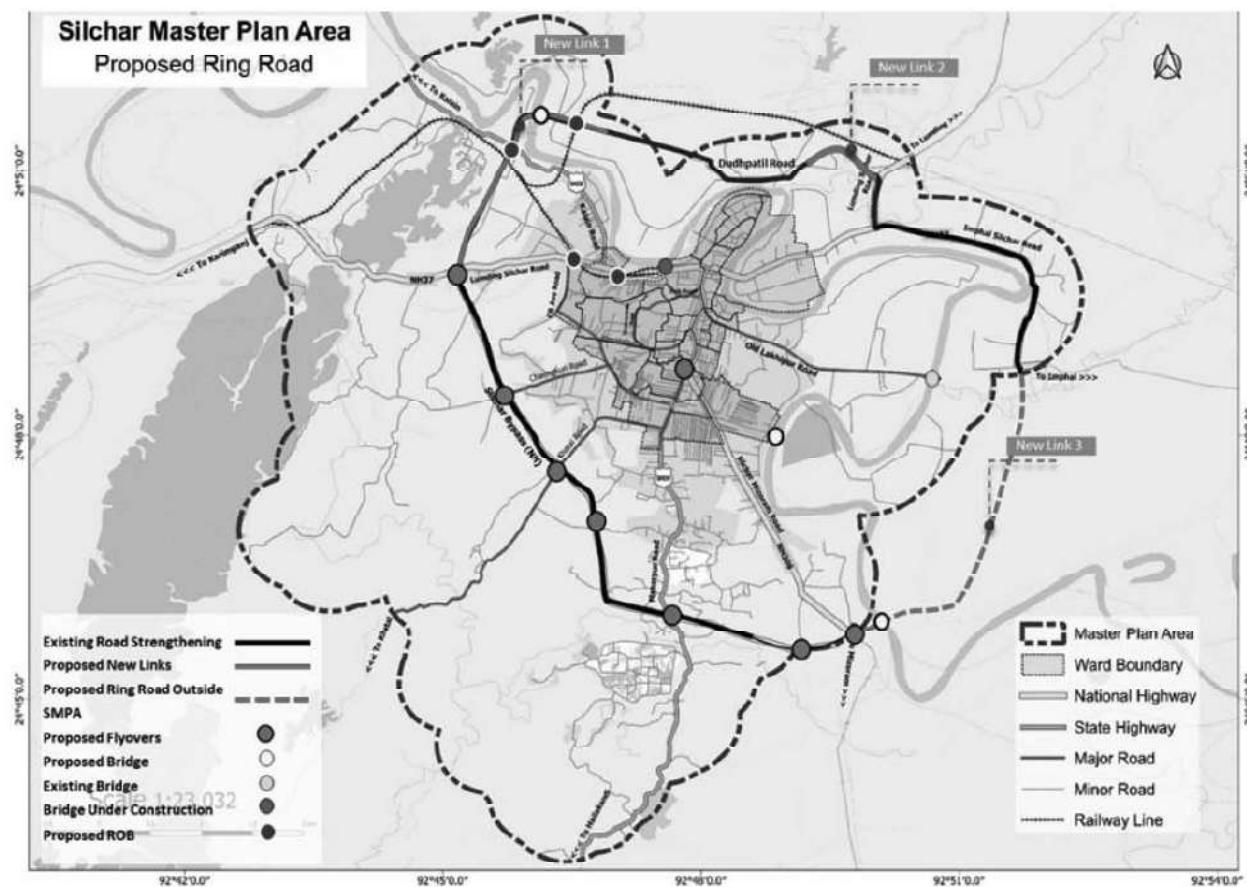
Figure 136 Proposed Ring Road alignment within SMPA

6.13.1.1 Widening and Acquisition in Proposed Ring Road

Table 166 Ring Road Description

Sl. No.	Road Section	Length (km)	Existing C. W. (m)	Available ROW (m)	Proposed ROW (m)	Proposed Configuration
1	Silchar Bypass	12	12	45	45	4 lanes divided (Land acquired)
2	Dudhpatil Road	4.2	7	10	45	4 lanes divided (Widening required)
3	IOCL Road	1.29	10	-	45	4 lanes divided (Widening required)
4	Lumbding- Silchar Highway	1	24	30	45	4 lanes divided (Widening required)
5	Imphal Road	5.45	12	12	30	4 lanes divided (Widening required)
7	New Link 1	5.5	-	-	45	4 lanes divided (land acquisition required)
8	New Link 2	0.6	-	-	45	4 lanes divided (land acquisition required)
9	New Link 3	7.36	-	-	45	4 lanes divided (land acquisition required)
Total		37.40				

6.13.2 GRADE SEPARATION PROPOSALS

Grade separation is the separation of the levels at which roads cross one another to prevent conflicting rows of traffic or the possibility of accidents. Here the existing road is single lane with the 12 m of carriage way which is proposed to be a 4-lane road. The proposed location of grade separator is depicted in figure 137.

6.13.2.1 Grade Separator on NH-37

A flyover has been proposed on NH-37 (Karimganj-Silchar Road) which will make the traffic flow on trunk road uninterrupted and solve the issue of congestion due to major road intersections. The heavy motor vehicle traffic movement will be diverted to proposed ring road at the intersection. This is proposed on the NH-37 and Silchar bypass road intersection. Refer figure 137 where the elevated section is shown with blue colour and the ramps are shown in pink color.

Table 167 Road details of Intersection 1 - Grade Separation Proposal

Road	C.W. Width (m)	Lanes
NH-37 (Karimganj-Silchar Road)	7.5	2 lanes undivided Two-way
Silchar Bypass Road	7.2	2 lanes undivided Two-way

Figure 137 Proposed Grade Separator at NH-37 and Silchar Bypass Intersection

(Source: Compiled by Consultants)

The proposal of flyover (grade saperator) is given as per the traffic congestion observed and considering the analysis conclusions. The possibility of construction of overbridge is to ease out the traffic blocking and bottel neck situation in daily peak working hours by heavy motor vehicles like Trucks and Buses.

6.13.2.2   Grade Separators for Ring Road

Considering the decongestion of Silchar core city area, the improvement of present arterial roads and development of redial roads provisioned in transport network. Present Silchar Bypass road will be the part of proposed ring road and will be widened up to 45 mt of RoW. To make the ring road speedy, safe, less time consuming and uninterrupted number of flyovers have been proposed to eliminate intersects with major existing and proposed crossroads. The grade separators for ring roads are mentioned below,

1.   Silchar Bypass – Chengkuri Road

2.   Silchar Bypass – Khatal Road

3.   Silchar Bypass – Atalbosti Road

4.   Silchar Bypass – Hailakandi Road

5.   Silchar Bypass – Mizoram Road

6.   Silchar Bypass – Saidpur Road

The locations and proposed model of all above mentioned grade separators (flyovers) have been mentioned in blow images.

1 Grade Separator on Silchar Bypass – Chengkuri Road

Figure 138 Proposed Grade Separator at Silchar Bypass – Chengkuri Road Intersection

2 Grade Separator on Silchar Bypass – Khatal Road

Figure 139 Proposed Grade Separator at Silchar Bypass – Khatal Road Intersection

3 Grade Separator on Silchar Bypass – Atalbosti Road

Figure 140 Proposed Grade Separator at Silchar Bypass – Atalbosti Road Intersection

4 Grade Separator on Silchar Bypass – Hailakandi Road

Figure 141 Proposed Grade Separator at Silchar Bypass – Hailakandi Road Intersection

5 Grade Separator on Silchar Bypass – Mizoram Road

Figure 142 Proposed Grade Separator at Silchar Bypass – Mizoram Road Intersection

6 Grade Separator on Silchar Bypass – Saidpur REC Road

Figure 143 Proposed Grade Separator at Saidpur Road

6.13.2.3 Grade Separator on Central Road

After conducting different traffic and transportation survey including junction analysis it is found that the area from civil hospital to Rangirkhari junction is highly congested and high traffic volume intensive in pick hours. Considering the average daily traffic, the present RoW is insufficient and exhaustive to carry daily pick hour ridership. To eliminate this issue, fly over of at least 700 mt length starting from Lochan Bairagi Road to Rangirkhari circle has been proposed. This will lead to make the daily traffic movement efficient and uninterrupted from Civil Hospital to Hailakandi Road. The proposed location and model has been mentioned below.

Figure 144 Proposed Grade Separator at Central Road

6.13.3 ROAD OVER BRIDGE (ROB) PROPOSALS

The Road Over Bridge (ROB) are constructed where Road alignment crosses above the Railway alignment. ROBs are usually constructed where enough space is available for the approaches. The requirement of vertical clearance for Railway is more than Road section. Thus the more approach length is required in case of ROB.

6.13.3.1 Road Over Bridge - 1 (ROB)

ROB has been proposed on existing railway line of Sadar Railway Station and Kalain Road (SH-38) which will help the barrier less traffic movement along proposed ring road within SMPA. This will help to reduce trips towards city center seeking the access toward Airport and Lakhipur Road. This ROB will also be proved less time consuming for daily riders who will travel for proposed Administartive Block for State and Central Silchar Government Offices and Departments. This will also solve the issue of congestion due to major road intersections and heavy vehicle traffic movement at city centre intersection. Refer figure 145 where the elevated section is shown with blue colour and the ram is shown in pink color.

Table 168 ROB Grade Separation Proposal

Road	Particular	Width (m)	Remark
Railway Line	Broad Gauge	10 mt	Single line
Kalain Road	SH - 38	10 mt	2 lanes undivided Two-way

(Source: Compiled by Consultants)

Figure 145 Proposed ROB over Rail Line and SH-38

6.13.3.2　　Road Over Bridge - 2 (ROB)

To complete the loop of ring road and to have an uninterrupted traffic movement, another ROB is required and which has been proposed on existing railway line towards Moinarband Railway Station at Dudhpatil Pt.V. This ROB will help the barrier less traffic movement along proposed ring road within SMPA. This will help to reduce trips towards city center seeking the access toward Airport and Lumding Road. This ROB will also be proved less time consuming for Heavy Motor Vehicles moving towards proposed Industrial area near IOCL. This will also lead for smoother traffic flow and help to serve proposed admin block and neighborhood development. Refer figure 146 where the elevated section is shown with blue colour and the ramps are in pink color.

Figure 146 Proposed ROB over Rail Line at Dudhpatil

6.13.3.3　　Road Over Bridge - 3 (ROB)

Railway crossing on NH-37 (Ramnagar Road) at Tarapur Pt. VII is a major bottleneck for daily raiders towards city center during pick working hours. Considering the importance and the capacity of road being National Highway there is a dire need of having ROB at this place to.

To complete the loop of ring road and to have an uninterrupted traffic movement, another ROB is required and which has been proposed on existing railway line towards Moinarband Railway Station at Dudhpatil Pt.V. This ROB will help the barrier less traffic movement along proposed ring road within SMPA. This will help to reduce trips towards city center seeking the access toward Airport and Lumding Road. This ROB will also be proved less time consuming for Heavy Motor Vehicles moving towards proposed Industrial area near IOCL. This will also lead for smoother traffic flow and help to serve proposed admin block and neighborhood development. Refer figure 147 where the elevated section is shown with blue colour and the ramps are in pink color.

Figure 147 Proposed ROB on (Ramnagar Road) Tarapur Pt. VII

6.13.3.4   Road Over Bridge - 4 (ROB)

Presently, an active ROB is located on NH-37 from Ramnagar side on railway line just before Silchar Railway Station. Since the ROB is quite old the traffic carrying capacity and condition of structure is exhausted. Therefore, the retrofitting of existing ROB and construction of parallel flyover is direly required for smooth flow of traffic and to carry the up and downside traffic efficiently.

Considering the importance of road as an Arterial and Feeder Road to Silchar Railway Station and Town the construction of parallel ROB is envisioned to make the positive differences in daily ridership of citizens.

This will also lead for smoother traffic flow and help to serve proposed core city and heritage block and neighborhood development. Refer figure 148 for location and proposed ROB design model.

Figure 148 Proposed ROB on NH-37 from Ramnagar side

6.13.4 RIVER BRIDGE PROPOSALS

6.13.4.1   Proposed Bridge 1
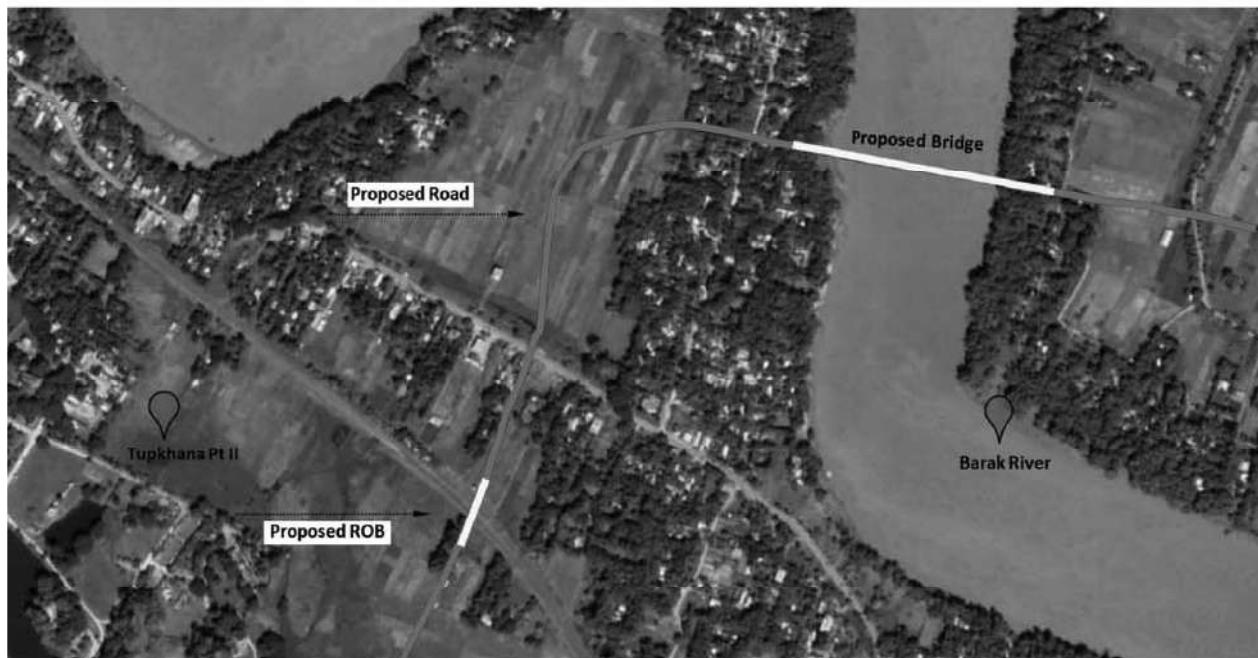
Figure 149 Proposed Bridge on Barak near Tupkhana Pt II

6.13.4.2   Proposed Bridge 2

Figure 150 Proposed Bridge on Barak near Sonabari Ghat

There is requirement of two bridges proposals over Barak River to complete entire ring road alignment for better traffic movement and ease out the traffic congestion and bottle neck issues in and around the Silchar city. As per the best suited alignment the bridges are proposed on Barak River near villages Tupkhana PT II, and Sonabarighat as mentioned in Figure 149 & 150. Theses bridge will not only boost the inter village connectivity but also will increase the chance of better trade and commerce with multiplying employments in the region.

6.13.5 PROPOSED IPT STANDS AND ROUTES

Intermediate Public Transport (IPT), sometimes known as Paratransit, refers to road vehicles used on hire for flexible passenger transportation, which do not follow a fixed time schedule. They may or may not follow a fixed route. It will be much viable if proper space allocation being done for the passanger transfer movement at prime locations. Here, mentioned in map are identified IPT stand for passenger's safe trasfer for one mode to another mode.
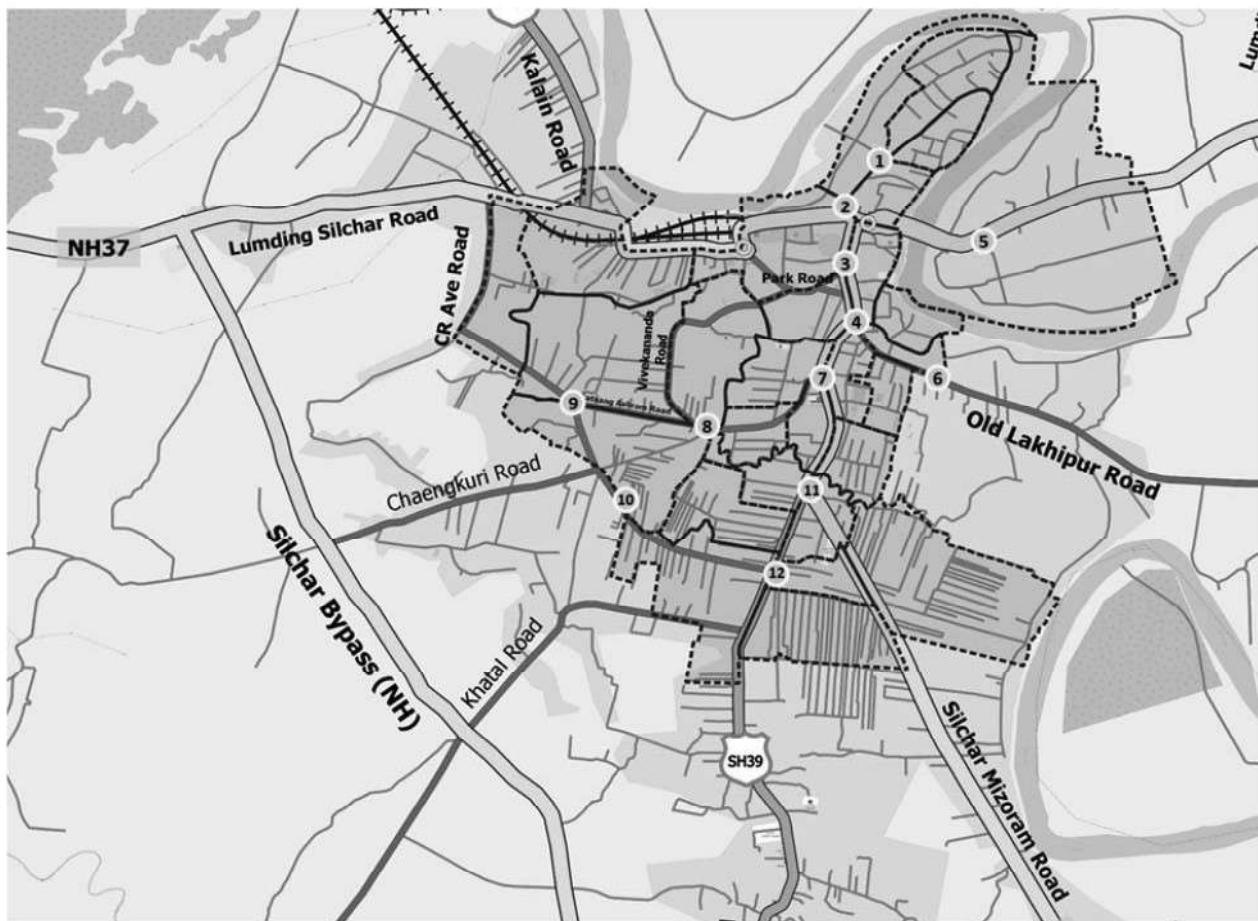

Figure 151 Proposed IPT stands

Figure 152 Proposal for IPT stands location

6.13.6 JUNCTION IMPROVEMENT

6.13.6.1 Intersection - 1 (Capitol Point, Sadarghat)

The current capacity of junction may be improved by widening the road width of Central Road by 18 mt. with divided 4 lanes, removing electricity poles and vendors along with geometric improvement and signalisation. Widening of NH-37 Road will ease out manoeuvring movement of vehicle around junction.

6.13.6.2 Intersection - 2 (Janigunj Junction)

The current capacity of junction may be improved by widening the road width of Central Road by 15 mt. with divided lanes with median, removing electricity poles and vendors along with geometric improvement and signalisation. Widening of Park Road up to 15 mt will ease out manoeuvring movement of vehicle around junction.

6.13.6.3 Intersection - 3 (Ambikapatty Junction)

The current capacity of junction may be improved by widening the road width of Central Road upto 18 mt. and Ambikapatty road upto 15 mt. with divided lanes with median. Additionally, removing electricity poles and Adhoc vendors along with channelization of junction, geometric improvement and signalisation will ease out the traffic condition at junction.

6.13.6.4 Intersection - 4 (Rangirkhari Junction)

The current capacity of junction may be improved by widening the road width of Central Road by 24 mt. Additionally, removing electricity poles and vendors along with geometric improvement and signalisation. Widening the road width of Meherpur road up to 30 mt. with median provision and proper laning with strip markings will make manoeuvring movement of vehicle around junction safe and well managed.

6.13.6.5 Intersection - 5 (Park Road Junction)

The current capacity of junction may be improved by widening the road width of Central Road by 18 mt. Additionally, removing electricity poles and vendors along with geometric improvement and signalization. Widening the road width of Park Road up to 18 mt. with median provision and proper laning with strip markings will make maneuvering movement of vehicle around junction safe and well managed.

6.13.7 ROAD HIERARCHY

It is important to device a street classification which is in consideration with the proposed landuse. The roads are classified into the following 3 categories according to their function and activities that take place along the road.

Table 169 Road Category Proposed for Silchar Planning Area

Sr. No.	Category	Characteristics	ROW
1.	Arterial	• City to City linking • Largest volumes of traffic • Commercial/Mixed residential uses are predominant along the road	60 m
2.	Sub-Arterial	Mixed residential Use along the road • Feeding traffic to arterial roads	24 m & 30m
3.	Major Roads	Connecting residential areas with sub arterial roads/arterial roads	18 m & 24 m

6.13.7.1 Arterial Road

A typical cross section of an arterial road is given in the figure below. It shall have carriageways, median, Multi Functional Zones (MFZ), service lanes and footpaths. Multi functional zone is a zone to accommodate street components such as tree planting, auto rickshaw stand, hawkers zone, bus stop, traffic police booth, fire hydrants, street lights etc. as per the requirement. The RoW of the arterial roads varies between 45m and 60m.
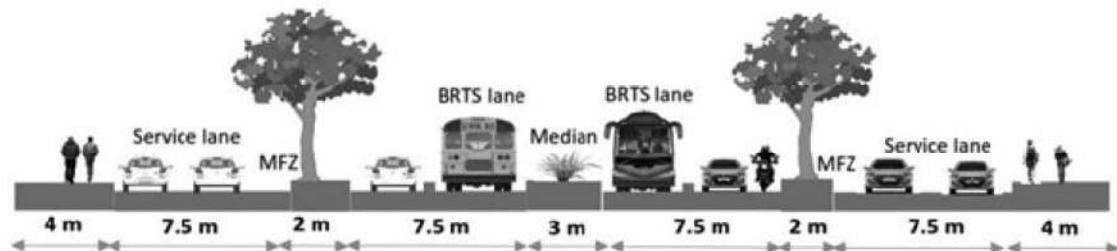

Figure 153 Cross Section of 45m wide Arterial Road
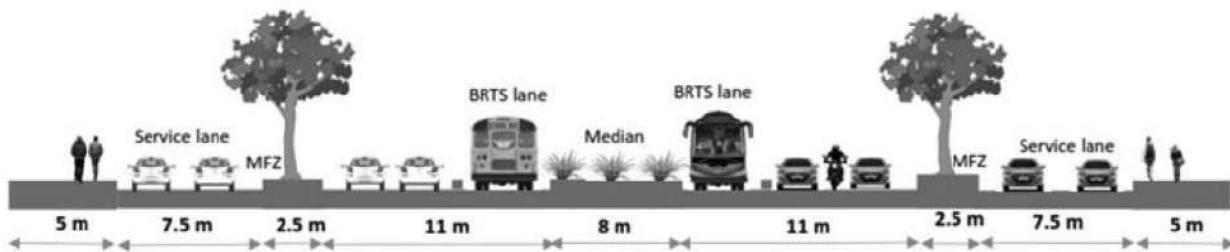
Figure 154 Cross Section of 60m wide Arterial Road

6.13.7.2 Sub-Arterial Roads

Sub arterial roads shall have carriage ways, median, service lanes, Multi-Functional Zones and sidewalks as shown in the figure 155. As mentioned earlier, the RoW of the sub-arterial road is between 24m or 30m.
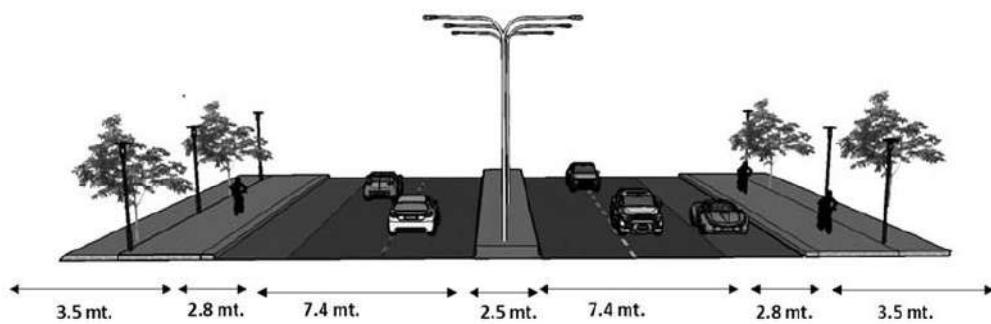
Figure 155 Cross Section of 30m wide Sub-Arterial Road

6.13.7.3 Major Roads

Major roads shall have Carriage ways, median, Multi-Functional Zones and sidewalks as shown in the figure 156. As mentioned earlier, the width of the major road is either 18m or 24m.
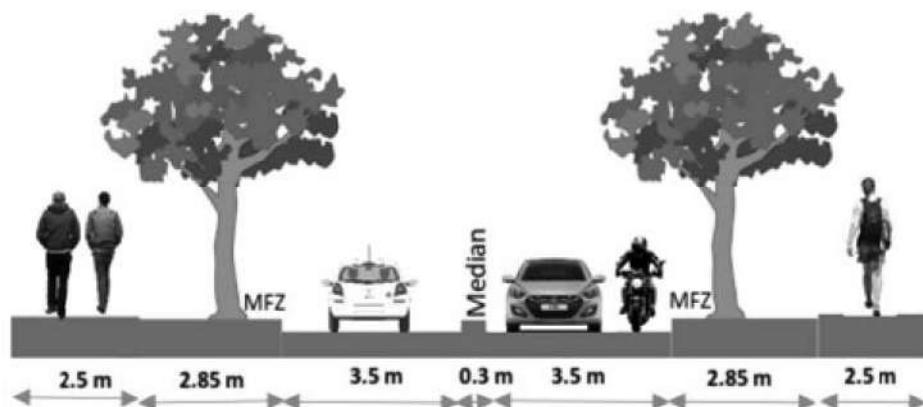

Figure 156 Cross Section of 18m wide Major Road
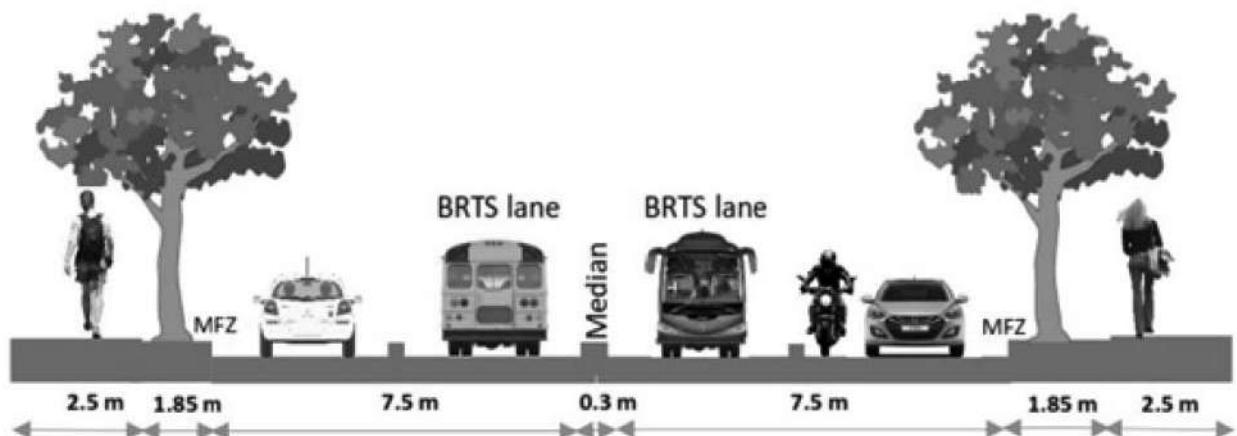
Figure 157 Cross Section of 24m wide Major Road

6.13.8 PUBLIC TRANSPORT PROPOSALS

6.13.8.1 BRTS (Bus Rapid Transit System)

Bus Rapid Transit System (BRTS) are generally a high-quality bus based transit system that focuses its operations in large urban areas with fast, comfortable, cost effective services catered for larger commuter populations. BRTS achieves it through the adoption of dedicated lanes with bus bays and bus stations typically aligned to the center of the road, off board fare collection and fast and frequent operations. BRTS is similar to a light rail system, it is considered to be more reliable, convenient and faster than regular bus services due to the fact that they run on dedicate bus bays and hence not delayed by the regular city traffic.

The Silchar City bus system needs to be improved to attract a large portion of the commuters to avoid the use of private vehicles in favour of public transport. For this the prevailing city bus system needs to be strengthened, this can act as a support for the mass rapid transit systems which are elaborated above. BRTS is a successful system adopted by many Indian cities like Ahmedabad and Indore. Due to faster implementation, lesser capital investment BRTS is a good alternative for sustainable transport solution for the planning area. BRTS can be implemented along the major transit corridors like NH-37, SH-3,, SH-18, Old NH and other major roads like Laokhowa Road, AT Road, Silchar-Lumbding Road. Due to the non-contiguous nature of the planning area BRTS on these said roads might have to pass through normal traffic in areas which falls under core city centre, this might affect the operational advantage of BRTS systems.

Figure 158 Bus Rapid Transit System